The Canadian Medical Association Journal

With which is incorporated the MONTREAL MEDICAL JOURNAL and the MARITIME MEDICAL NEWS

Editor

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OLD SERIES VOL. LX

NEW SERIES VOL. XXIV

Published by

THE CANADIAN MEDICAL ASSOCIATION

1931

The Canadian
Medical Association Journal

Vol. XXIV TORONTO, JANUARY, 1931 No. 1

FOREWORD

WITH this issue the *Journal* begins a new volume and enters upon another year of activity.

We hope and believe also that this will prove to be another year of progress. Some new ideas are to be tried out that should appeal to most of our readers. Perhaps the most notable of these is the publication monthly of clinics with a practical bearing, which are to be contributed by well known teachers. This should bring the class-room again to the medical graduate who has long left his college and forge anew the links between preceptor and pupil. The idea has been taken up by the teachers, at least, with enthusiasm. Then, we intend to publish a series of papers, designed for the general practitioner and the man working in the small hospital, dealing with the theory and practical applications of radiology and physio-therapy in their various aspects. These papers will be written by men expert in these particular fields, and will be submitted for comment to specialists and others, in the hope that all sides of the subjects will be fully canvassed. We hope also to be able to present a number of articles that will be a help to those interested in the periodic health examinations. For some months past papers have been appearing that deal with certain aspects of pharmacology and pharmacy. These have attracted considerable attention, both here and abroad, and will be continued.

From time to time questions have been sent in to the *Journal* which have been answered privately. Believing that such questions, with their answers, would be of widespread interest, the Editorial Board has decided to establish a department for "Queries and Answers", and invites our readers to take advantage of it. Without claiming omniscience, the editors will endeavour to answer all questions received, and, where they fail, will call upon expert knowledge from outside.

Many general practitioners, from lack of literary training, or want of time, may feel themselves unequal to the task of preparing formal articles. We invite such to write to the *Journal*, giving their interesting experiences in practice, stating their difficulties, passing on valuable "tips" in treatment, and advancing new ideas. Such letters should be of more than passing interest and value. Make the *Journal* a "clearing house" for medical thought. Here is a field which the general practitioner might make particularly his own.

The scope of the abstracts which we publish from other journals will be enlarged, and additional communication with distant parts of the Empire will gradually be opened up.

Finally, the editors ask for a continuation of the sympathetic cooperation of the members of the Association, without which the *Journal* cannot advance. Let us make the *Journal* still more worthy of Canadian Medicine and an even greater factor in scientific progress.

The editors wish every member of the Canadian Medical Association all the good of life for the coming year.

The Physician's Prayer
(Maimonides).

ALL-KIND! Thou hast formed the body of man in full wisdom, uniting within him ten thousand times ten thousand tools, unceasingly active to maintain the envelope of his immortal soul, this beautiful entirety in harmony, continually busy in complete order, agreement and accord. Whenever this order is broken by the fragility of the matter and the untamedness of the passions, the powers come into conflict and the body falls into dust. Then Thou sendest man Thy merciful messengers, the diseases, and they tell him that danger is approaching, and urge him to forefend it.

Thine earth, Thy streams, Thy mountains Thou hast blessed with such things as may bring remedy, and may mollify the pains of men and cure their ills.

And Thou hast endowed man with wisdom so that he may relieve the body of ill, recognize order and disorder, and discover the proportions of things, ascertain their functions, and prepare against each evil that which may ameliorate or prevent it.

Me also Thine eternal providence hath chosen to watch over the life and health of Thy creatures. I am about to begin the exercise of my profession. Aid me, O All-kind One, in this great work, so that it may be of avail, for without Thine assistance nothing succeeds, not even the least.

May the love of my fellow-man and of my art ensoul me. May not thirst for gain nor craving for fame mingle in my service, for these are enemies of truth and charity, and they might mislead me, and keep me from doing what I ought to do for the weal of my fellow-men.

Preserve the strength of my body and of my soul, so that I may be unperturbably ready to help the rich and the poor, the good and the bad, the enemy and the friend. Let me see in the sick the man alone. Enlighten my understanding that I may see what is before and encompass it, and that I may surmise what is absent and detect what is hidden. Let my mind not sink, lest I fail to recognize what is visible and overvalue it; lest, indeed, I see what is not to be seen at all. For the limit in my art is lightly traced, and it comprises the health and life of men.

May my mind be always on the alert. While I stand at the bedside let not alien things intervene to rob me of attentiveness, nor disturb me in my silent meditation, for great and holy are the searchings on which depend the weal and woe of Thy creatures.

Grant that the sick may have confidence in me and in my art, and that they heed my advice and orderings. Banish from their side all quacks, and the host of counselling kindred and of overwise nurses, for these are a cruel people, and pervert the best intentions and thwart those who are expert in the healing art, and they lead men to death.

If wiser men wish to teach and correct me, may I follow them and be grateful; for the compass of our art is large and wide. But if zealous fools upbraid me, then let the love of my art keep me strong, so that I may adhere to truth without regard to years and fame; for weakness and yielding would involve the pain and even the death of Thy creatures.

Let me be patient and calm when older men of my profession, proud in the number of their years, crowd me out or taunt me or offer jeeringly to better me. But let this, too, be for my improvement, for they know things that are forgotten of me; still let not their conceit grieve me. They are old, and old age is not master of the passions. I, too, hope to grow old upon the earth, before Thee, O All-good.

Give me frugality beyond all, except in the great art. May never awaken in me the notion that I know enough! Oh give me strength and leisure and zeal to enlarge my knowledge, and to attain ever to more. Our art is great, and the mind of man presses forward for ever.

All-good! Thou hast chosen me, in Thy grace, to watch over the life and death of Thy creatures. I am about to go to my labour. Be with me in this great work, so that it may avail, for without Thy help nothing succeeds, not even the smallest!

A Clinical Address

ON

THE SIGNIFICANCE OF RECOIL FOLLOWING VISCERAL DECOMPRESSION*

BY SIR W. I. DE C. WHEELER,

Dublin

THE subject to which I venture to draw attention embraces so many problems that it is only possible to touch the fringe of it. These problems chiefly concern biochemists, physicists, physiologists, and other laboratory workers. There are, however, some fundamental principles with which the surgeon is confronted in his daily work. Patients seek advice for countless ailments, but if we exclude traumatic and inflammatory conditions, a large number of the remainder suffer directly or indirectly from the effects of pressure or back-pressure on an organ or system; the morbid changes produced by these pressures or by their sudden release are worthy, I think, of general review.

An external stress acting slowly is followed by a mechanical adaptation of the organ or system within the limits of life; acting quickly or suddenly it may produce a strain sufficient to rupture an organ or cause an irreparable disturbance of a vital system. If this pressure is unrelieved, it leads finally to dissolution of the organ or system, resulting in death. If it is suddenly relieved, there is an equally sudden recoil, which may even exceed the original pressure in its destructive force. This recoil rarely, if ever, produces actual rupture of a tissue or organ, but it may cause cell rupture to the nervous mechanism, which are a menace to life. On the other hand, if the relief is gradual and not too long delayed, functional and anatomical recovery may be expected.

In other words the change produced in an organ by gradually increasing back-pressure is in all probability primarily a vascular one. The direct pressure on arterioles in combination with reflex vaso-constriction causes closure of some of the capillaries, with the result that the active cells of the organ receive a diminished nutritive supply, and there is less functional activity. Later the cells themselves are disorganized by the pressure effects, as is seen in the case of the kidney and other organs. If the pressure is suddenly removed, the capillaries expand, and with the removal of the vaso-constrictor reflex the arterioles also become dilated. The organ is flooded with blood, and becomes acutely congested. The cells, unable to withstand the sudden torrent, fail and break down. Cellular œdema, vascular stagnation, and functional collapse supervene.

Treatment appears to be governed by a principle of almost universal application, namely, *when an organ or system is suffering directly from pressure effects or indirectly from back-pressure, the greater the pressure, the more gradual should be its relief.*

When choosing this subject for discussion, I had in mind such conditions as uræmia, following the release of back-pressure on the kidneys, hepatic shock in portal obstructions or obstructions of the common duct, with or without ascites, toxæmia, and other morbid conditions in the presence of intestinal obstruction, and flapping mediastinum in acute empyema. The dangers attending a too generous tapping of the pleural or peritoneal cavities for effusions, and the risks of spinal puncture when the pressure is high, may be added to the list. Later, I will refer briefly to these conditions.

The problems involved, however, are by no means confined to the realm of surgery. For example, in the sphere of medicine we find patients with back-pressure on the heart from disease and narrowing of the arteries, with resultant hypertrophy, dilatation, and cardiac

* Given at the combined meetings of the British and Canadian Medical Associations, Winnipeg, August, 1930.

failure. As the back-pressure continues and increases, compensation fails and secondary lethal changes (often renal) complete the picture. If it were possible by the use of drugs to reduce the blood pressure suddenly, the "cure" would be admittedly worse than the disease; cardiac and renal failure would inevitably result. Physicians insist that only those appressor drugs should be chosen which have the slowest and most prolonged action. Anæsthetists are alive to the dangers of sudden decompression. Anæsthesia by spinal injection or chloroform inhalation must be cautiously adopted, or entirely avoided in the presence of high blood pressure. The rapid fall so frequently noted if either of these methods is employed produces at times an alarming reaction, including sudden failure of the cardiac pump or stoppage of renal function. In ophthalmic departments the oculist deals with glaucoma by the very slow withdrawal of aqueous humour from the anterior chamber. By gradual decompression, vascular dilatation, intra-ocular hæmorrhage, and retinal detachments are avoided. Obstetricians are concerned in cases of hydramnios. If the formation of fluid is slow, the system accommodates itself to the increasing pressure, but if it is quick, the circulation suffers; the lips, hands, and feet become cyanosed; there is indigestion and vomiting, and albumin appears in the urine. Bursting of the membranes, on the other hand, causes a recoil which induces syncope by rapid reduction of intra-abdominal tension. When inducing labour in cases of hydramnios the obstetrician lays special stress on the necessity for preventing a sudden outpouring of the fluid. To effect this control, and to ensure the slow escape of the waters, a very small or valvular aperture is provided. Again, in cases of imperforate hymen leading to hæmatocolpos the obstructing membrane is punctured with a trocar and cannula, and the fluid allowed to drain slowly away during the first twenty-four hours. If the fluid is not drained slowly, the patient may pass into a condition which is usually described as one of extreme shock. There is, however, in the obstetrical sphere a most striking example of accommodation to ever-increasing intra-abdominal pressure by stretching of the abdominal wall, and conversely an example of sudden release followed by no ill effects. I refer to normal pregnancy and parturition.*

HYDRONEPHROSIS

The changes which occur in the urinary tract, when the outflow is impeded by enlargement of the prostate and other partial obstructions, have received accurate attention, and thus the effects of back-pressure are comparatively well understood.

There is first the compensatory hypertrophy of the bladder, and then degeneration of the musculature. Dilatation of the bladder, of the ureters, pelvis, calyces, and uriniferous tubules follows, accompanied by pressure atrophy of the parenchyma and its constituent cells. Renal insufficiency and potential or actual uræmia is the result. Cardio-vascular disease keeps company with such changes. It goes side by side with prostatic enlargement in about 42 per cent of the cases. Furthermore, cardio-vascular disease improves *pari passu* as the renal function is restored by carefully planned treatment.

Recent investigation of the relationship of preliminary treatment to mortality has established the advisability of gradual decompression in all cases, whether there is evidence of back-pressure or not. It is traditional that sudden decompression, either by uncontrolled cystotomy (as a preliminary procedure), or by primary prostatectomy, is followed by a high mortality. In fact, rapid emptying of the distended bladder by any method may be followed by acute œdema and congestion of the urinary tract leading to complete loss of renal function. The engorgement of the kidneys on release of pressure is not surprising when we remember that the whole of the blood of the body passes through the kidney every few minutes. These destructive changes are in sharp contrast to the reparative phenomena which follow gradual decompression. Renal cells, like hepatic cells and cardiac cells, have a definite power of regeneration if the causes producing degeneration are removed. Limited regeneration of the tubular epithelium has been found after operative incision, after moderate toxic destruction, or after the relief of a hydronephrosis.

* M. Remy states that a few hours after childbirth death may occur in cases without any lesion, by a sort of inhibition on the heart from the abdominal sympathetic. He adds that intestinal hæmorrhages in newborn infants are mechanical hæmorrhages due to variations of pressure resulting from the change in the mode of circulation at the moment of birth.

In proof of this power of repair it has been shown by animal experiment that a hydronephrosis of seven days' duration returns anatomically and functionally to about normal when the obstruction is relieved. The recovery is more prompt if the opposite kidney is removed or out of action from disease. If, on the other hand, compensatory hypertrophy of the opposite kidney takes place, the atrophy of disuse and not repair will follow on the obstructed side. A hydronephrosis of from fourteen to twenty-eight days' duration requires the stimulus of compulsory function for recovery; the stimulus must be gradually and not suddenly applied.

A small amount of renal tissue will suffice to maintain health, and it is the principal aim of decompression to save any small amount which has survived the destruction of back-pressure. In old-standing cases some of the kidney is irreparably damaged; some is damaged but is capable of regeneration; and there is probably in most cases a residue which has not yet become embarrassed. Glomeruli once out of action never recover, but the survivors deliver the urine, and with the reserve glomeruli are capable of double work.

Clinically, the restoration of renal function following careful decompression can be watched in the wards of any general hospital. Headache disappears; thirst is relieved; blood pressure falls; the specific gravity of the urine rises; blood urea is diminished; and urea elimination tests become satisfactory. Uniformly satisfactory results cannot be obtained by haphazard methods.

In cases of overdistension of the bladder, the path of safety is not the inserting of a catheter, and the withdrawal of small amounts of urine every few hours, nor is it safe to empty completely the bladder and to refill it partly with boracic or other solutions. In both methods, particularly in the latter, there is sudden relief of intravesical pressure. To refill the bladder with solution is of little value, since congestion occurs during actual withdrawal of the urine. It has been shown that the pressure in the bladder in cases of retention is reduced by 50 per cent after the withdrawal of the first 100 c.cm. of urine, and that the initial withdrawal of this small amount may induce renal and circulatory shock. In anxious cases some such method as that introduced by Van Zwalenburg should be adopted. The urine is just permitted to trickle into a receptacle adjusted at a correct level above the bed. The catheter is clamped when the patient is moved for nursing purposes. It requires two to eight days to empty the bladder in this way. Our own practice is to empty the bladder by a reversed Murphy drip apparatus attached to an indwelling catheter.

LIVER SHOCK

Back-pressure on the liver cells from obstruction to the outflow of bile, or from congestion, is not so serious nor so rapid in its results as in the case of the kidneys. Mayo attributes this to pre-existing low blood pressure in the liver tissue. Sudden relief of tension by drainage of the common duct is therefore not attended with the same risk as sudden emptying of the overdistended bladder. Nevertheless, a cessation of hepatic action may follow sudden decompression, and is comparable to the cessation of renal function. Mayo states that greatly distended gall-bladders require mechanical devices to provide for slow emptying. Hepatic insufficiency and hepatic shock are not sufficiently understood. There are, however, a few established facts. In the first place, liver cells are known to possess recuperative power of a high order. Secondly, this recuperation can be stimulated in cases of portal obstruction by procedures which produce a gradual vascular decompression, such as the Talma-Morison operation with or without splenectomy. Thirdly, in cases of marked biliary obstruction, slow drainage of the gall-bladder or common duct will permit of similar recuperation.

Pressure causing loss of function is signalled during operation by the appearance of white bile (a secretion of the ducts and comparable to the fluid found in hydronephrosis). When the liver is still functioning, but becomes embarrassed by sudden operative decompression, there is sometimes a free flow of bile followed by cessation of the flow later; liver shock supervenes with symptoms resembling uræmia.

ASCITES

In the old days fluid was withdrawn from the abdomen by tapping with a large trocar and cannula while the patient was kept in a sitting or semi-sitting position. Sir William Ferguson,

in his *System of Practical Surgery,* published in 1870, draws attention to the dangers of this procedure. He mentions that as the fluid escapes, the pressure on the vena cava becomes less, and that there is a probability of the patient fainting unless the pressure is maintained by a tight binder.

By modern methods paracentesis can be frequently repeated without anxiety or mishap. But there are cases seen from time to time in which the patient, at first considerably relieved, subsequently falls into a state of progressive cachexia and may succumb. Various explanations are given. Lyonnet and Teyssier in 1902 drew attention to the enormous amount of albumin which was contained in the fluid removed, and suggested that this fluid should be kept in a refrigerator, and replaced daily by small rectal injections. I think this is regarded physiologically as unsound, for biochemists teach us that absorption could not take place.

Mlle. Grunvald refers to weakness and fainting at the beginning of puncture, which is merely a reflex phenomenon occurring in impressionable people.* Collapse at the end of puncture she attributes to cerebral anæmia brought about by the sudden efflux of blood into the abdominal organs on the release of pressure. Syncope may be accentuated after quick withdrawal of fluid in patients suffering from ascites (not necessarily secondary to cirrhosis), by hæmorrhage into the intestines *a vacuo* and abdominal wall *en nappe*. These hæmorrhages are found post-mortem to be associated sometimes with actual ulceration or punctiform ulcerations of the middle and terminal portions of the small intestine. Not only hæmorrhage but jaundice and grave nervous symptoms occasionally follow paracentesis in cases of cirrhosis.

Sudden death may be explained by the lowering of the diaphragm on the withdrawal of the fluid; increase in the thoracic volume is produced, and, when the myocardium lacks tonicity, acute dilatation of the heart *a vacuo* results. Several other factors, including hypohepatism, play a part in the fatal issue. This grave syndrome in the occasional case cannot be foreseen, and the line of safety is once again to provide for very gradual medical or surgical decompression when the pressure is high.

* A patient mentioned by M. Specker died from "reflex syncope" as the trochar entered the peritoneum.

INTESTINAL OBSTRUCTION

It is the common practice in cases of chronic obstruction to decompress the distended large intestine gradually by preliminary drainage. Probably far more is accomplished by this simple procedure than mere relief of toxæmia, the reduction of sepsis and restoration of the tonicity and size of the lumen of the bowel. The reparative changes which occur as the result of intestinal decompression may be more comparable in their remote effects to the changes following decompression of the liver and kidneys than is apparent in the present state of our knowledge.

In acute cases the mortality is still notoriously high, and the cause of death has given rise to much research and interesting speculation. Wilkie mentioned, among other fatal factors, splanchnic paresis and draining of the body fluids into the portal area followed by cerebral anæmia, and toxæmia from the absorption of poisonous products from the upper bowel. Reasoning by analogy, the former would follow too rapid decompression; the latter would be aggravated by back-pressure.

Looking in retrospect over a number of years, especially since the advantages of high jejunostomy have been realized, I feel sure that acute cases did best when a slow steady drain of intestinal contents could be established through a small tube. The worst cases were those in which drainage failed, but often equal post-operative anxiety was felt when the distended intestines were emptied as completely as possible at the time of operation by the use of a large tube. In like manner rapid drainage through a Paul's tube following operation, although often regarded as an encouraging omen, may be followed by deplorable results. The sudden relief of the distended abdomen, and the collapse of the intestinal walls, together with the flooding of the vascular channels and the fall in blood pressure, produce the clinical picture of general shock.

In a case where a band is divided, or an obstruction can be relieved otherwise with simplicity and the intestinal contents gradually evacuated *per vias naturales,* the results are uniformly good. If a small enterostomy tube which does not divert the entire flow, but acts in the

nature of a safety valve is inserted in the more advanced of the simple cases, the results are equally good. (The insertion of this tube is indeed essential in all but the earliest cases.) The recoil after the relief of acute intestinal obstruction is of a complex nature. The causes of death following operation need further elucidation.

EMPYEMA

It is well known that the mediastinum instead of being a rigid partition in the normal subject is so mobile that any alteration of pressure on one side is accompanied by an equal alteration of pressure on the other. It follows, and it is an accepted fact, that open drainage of an empyema is contraindicated when the condition is acute and of the non-adhesive streptococcal variety. The mortality following immediate decompression in such cases ranges from 40 to 60 per cent. By aspirations and slow decompression the mortality is reduced to from 5 to 10 per cent.

It took many years to learn the lesson that in the presence of a high positive pressure in the thorax sudden relief of this pressure was followed, in many instances, by sudden death. When the intrathoracic pressure is high, the intercostal spaces bulge, the mediastinum, liver, and diaphragm are displaced. With the sudden release of this pressure an acute pulmonary œdema may be provoked, or a to-and-fro motion of the mediastinum is established which involves the heart, great vessels, and important nerves. Flapping mediastinum has its effect on blood aeration and circulation, and a condition of shock is produced which is often incompatible with life.

Whether the pressure is high or only moderately raised within the thorax, whether the infection is pneumococcal and associated with adhesions of the lung to the chest wall, or streptococcal and diffuse, I believe the line of greatest safety is to aspirate or drain with a catheter before resorting to free evacuation of the pleural cavity.

Simple aspiration may occasionally be followed by fatal collapse and has been attributed to a vagal reflex induced by irritation of the inflamed surface of the lung which causes stoppage of the heart (Oliver). This explanation is not, however, convincing. It is more likely that aspiration alone may induce flapping mediastinum if the fluid is too rapidly withdrawn.

CEREBROSPINAL LESIONS

It is universally recognized that in the presence of high intracranial tension injurious or fatal effects may be produced by lumbar puncture. These effects are often due to dislocation of the cerebellar tonsils through the foramen magnum. The bulb becomes wedged, and anæmia and paralysis of the vital centres are the result.

Lumbar puncture is especially dangerous when hydrocephalus is associated with tumour. In many cases of high tension the recoil following uncontrolled withdrawal of fluid becomes manifest by vertigo, headache, nausea, vomiting, and rigidity of the neck muscles—a syndrome usually described as meningism. On the other hand, if the needle used is of small bore, and the withdrawal made very gradually and controlled by manometric readings, a slow decompression in most instances can be carried out without ill effects.

The indications for diagnostic lumbar puncture are manifold, but outside the ranks of neurological surgeons it is not generally appreciated that spinal compression may be aggravated by spinal puncture, and the signs and symptoms become more pronounced. It is therefore instructive after withdrawal of the fluid to seek clinically for further diagnostic information. The intensifying of the clinical picture may be due to the forcing downwards of the spinal tumour by the unopposed and unrelieved tension above. But whatever the cause, it is a great advantage to have an uncertain clinical picture converted into one of obvious spinal-cord tumour.

Elsberg and Stookey describe some cases in which the root pains became more severe after lumbar puncture and others in which moderate motor and sensory disturbances were followed by complete paralysis.

It is known that analogous changes may be observed in cases of intracranial growth. It should be understood, however, that the price paid for this diagnostic assistance may reach a high figure unless the amount of fluid withdrawn and the rate of withdrawal are carefully considered in each individual case.

Wieder refers to an article by Schonbeck, who collected seventy-one cases of fatality following lumbar puncture. Dandy mentions

three cases of tumour in which a sensory level appeared after lumbar puncture. In two cases this information was obtained at the cost of a sudden startling paraplegia and urinary retention. He thinks lumbar puncture alone is not a procedure of merit in the presence of cord tumour. The information which it yields is overbalanced by the potentialities of serious harm. On the other hand, Masson has no hesitation in performing lumbar puncture in the presence of brain tumour. He quotes Connor as stating that in a few cases of uræmia and brain tumour, death has followed within a few hours of the withdrawal of a large amount of fluid. This is a warning against a medical decompression, but should not be interpreted as *prima facie* evidence against a diagnostic puncture.

Masson reviews two hundred cases of lumbar puncture in increased intracranial pressure with only one fatality. In the majority of cases not more than 5 c.cm. of cerebrospinal fluid were withdrawn for examination. When it is found escaping under marked increase of pressure, the stylet is re-introduced into the needle and the fluid allowed to drip out slowly. He insists that needles of coarse calibre should never be used, lest the fluid escapes so quickly that it brings about a sudden marked change in intracranial pressure.

The therapeutic indications for lumbar puncture are limited. It is of decided value in cases such as acute anterior poliomyelitis and posterior basic meningitis. In the latter intracranial pressure becomes evident by bulging of the fontanelle, vomiting, and prominent features.

A sharp distinction must be drawn between diagnostic puncture which is safe and medical decompression which is attended with danger.

If the subject has been presented in a superficial manner in this review I beg your indulgence. It is because the problems concerned require an investigation into many departments of vital activity. In whatever manner such investigations may affect the ultimate lines of treatment, the principle will, I believe, remain, namely, that the greater the pressure the more gradual should be its release, or in the words of our forefathers, *cunctando restituit rem*—by delaying he restored.

Gratitude is also expressed for suggestions by Professors T. G. Moorhead and W. R. Fearon.

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THINGS NEW AND OLD*

BY DAVID A. STEWART, B.A., M.D., LL.D.,

Ninette, Man.

IT is a great privilege and honour to be President of the Canadian Tuberculosis Association, in this year of all years, when the members gather under the President's own roof-tree, with the very special pleasure of being hosts and hostesses to more than fifty confrères from Great Britain. Let me first of all, on behalf of the Canadian Tuberculosis Association, bid welcome to you who are our guests. We wish you could stay to see the western half of Canada, and much more of the east also, and give us at each centre of anti-tuberculosis activity the leisurely, unhurried kind of visit that makes for understanding of the work and the men behind it, and the conditions that drive us all. But if we have fewer days than we would like, we can at least use to their utmost what we have, and redeem this time with values that may last while we live. I welcome also the few representatives of our sister American nation, and pay you the compliment of considering you not so much guests as hosts and hostesses with the Canadians to our guests of once in a lifetime from the land of your fathers and ours. And, on behalf of the Manitoba Sanatorium, that living organism of chairman and board, superintendent and staff, patients and hillside, lake and sky, and the people of the province behind us, I welcome also the members of the Canadian Tuberculosis Association partly as guests, but chiefly as fellow hosts and hostesses, who have come to share with us the responsibility and pleasure and profit of this unique visit.

And now that various elements have been brought together let them herewith and hereby dissolve, and recrystallize into a new and happy compound, a united party. In this valley-side week-end, sitting around the same tables and mingling in the same ploys, may we not all put off the defensive stiffnesses of new acquaintances and drop at once into the easy and confidential relations of old friends. And I offer the suggestion—one cannot force such things—but I do suggest, that if we are all very much in the humour of it this week-end party may be a sort of reincarnation of that easy good-fellowship of souls,—

> "wel nyne twentie in a companye, of sondry folk, by aventure i-falle in felowshipe, and pilgryms were they all . . . . . in Southwerk at the Tabard, that toward Canturbury wolden ryde."

In that old Tabard "faste by the Belle," it was mine host, who chanced to be "bold of speche, and wys, and wel i-taught"—and certainly needed to be all these things—who proposed the program for the pilgrimage, and, what is more to the point, kept the pilgrims strictly to their jobs in it. Scarcely can we hope to recapture all the first fine careless rapture of Chaucer's pilgrimage, but, as host, I will try to do my whole duty at least in keeping you as pilgrims to your parts in the plan. And since I cannot altogether shirk mine host's responsibility for a plan for the pilgrimage, I must consider what best to put forth as a beginning of discussion on this much-looked-forward-to middle week-end of such an adventure across half a continent.

Naturally visitors are asking questions about things Canadian; and naturally also the Canadian sanatorium here present will be made a text for approval or warning, likely a little of both. Shall I try, then, to review for Canada, or Manitoba, the hundreds or thousands of sanatorium beds occupied, the millions of dollars used, or the ins and outs of the lowering of death rates?

> "Things done, that took the eye and had the price;
> O'er which, from level stand,
> The low world laid its hand,
> Found straightway to its mind, could value in a trice"

Or should I try also to put in words something of what,

* Address delivered at the annual meeting of the Canadian Tuberculosis Association—with British guests—at the Manitoba Sanatorium, Ninette, August 23 to 25, 1930.

"The world's coarse thumb
And finger failed to plumb,
So passed in making up the main account."

. . . . .

"Thoughts hardly to be packed
Into a narrow act"

I may perhaps do a little of both in trying to recall something of what our changing points of view about tuberculosis have been in the past generation.

Twenty or twenty-five years ago the bull's eye of our target was the young person who came to his doctor with just an occasional cough, or very slight fever, a little loss of weight, or a mere "colour" of blood, or unaccustomed excitability, with tiredness and irritability. It was for this man we built sanatoria. We built them cheaply, because if open air was the cure, the more our patient got of it, at all times and seasons, the better. Besides, we should not coddle him with luxuries he could not get at home. Anyway, tuberculosis was to be banished, bag and baggage, scrip and scrippage, so soon, that it would be wasteful to build permanent buildings to care for it. So our patient endured hardness in all weathers in an open shack, and went on exercises rather steeply graded, but did not get better right away, nor indeed always live happily forever after, as we were sure he would.

To make sure that we should get our man as soon as possible *after* symptoms actually began, we took the general practitioners on for a little instruction, especially in real and imaginary râles of various kinds and qualities. If they did not respond well we tried to catch them younger, at the chrysalis, or medical student, stage of development, with the same râles. And to make assurance double sure, we scattered pamphlets among people in general, as the police do, with a rogues' gallery picture of the plausible early symptoms of this arch criminal, tuberculosis, at large in the community, so that if ever he should commit the overt act of producing cough or fever or blood-spitting or loss of weight he would be apprehended at once. Meantime, he had to be considered innocent in any one case until proved guilty. In other words, we sat and waited for this one particular genus and species of fly to walk into our parlour, and took no very special interest in any other genus or species.

But this man was just one in one thousand of the manifestations of tuberculosis in the community. And even he was more or less hypothetical, for he rarely came for examination, and still more rarely when he came was he at the early and manageable stage we had planned for. As for the real "victim of the white plague," who intruded himself perpetually upon us, a mere bony anatomy racked by hollow cough, our sanatoria were not for such as he. We could offer him little but custodial care, for charity's sake, in some inconspicuous hospital ward, where he could die in peace. As for children, of course their reaction to tuberculin showed infection, old or recent, but their lesions were seldom demonstrable, and so fell outside of our rather rigid sanatorium scheme. We built open air schools for the worst of them, and taught better environment for all, so that they would miss definite adult disease.

By choice we were interested in people whose symptoms were just nicely noticeable, but not *too* noticeable. I do not wish to caricature or misrepresent the older views and enthusiasms. The marks were narrower then than now, but there was fine marksmanship and with many palpable hits.

The bull's eye of our target to-day is not the man who is sick and knows it, but the child who is infected and doesn't know it. It is easier to correct criminal tendencies than to cure crime, so why wait, as we did twenty odd years ago, for the overt act? Disease should not be endured if it can be prevented. It is wiser to maintain health than to regain it, and cheaper also. We have been accustomed to pay the price of preventable disease grudgingly and of necessity, as a police court fine, with or without imprisonment. But we are learning to pay for preventable disease by prevention, as we pay for a non-skid tire. It is better to pay for safety in advance, and enjoy it, than to have calamity thrust upon us to be paid on the instalment plan.

Twenty years ago or more the first question was, *what* made this man tuberculous,—dingy house, foul factory, late hours, dust, drink, bad environment generally? Now the first questions are likely to be: *who* made this man tuberculous? Where has he already scattered his disease? What circle of contacts is he infecting? Then we thought first and foremost

of the diseased person, but now usually first and most of the infected community. For when even one person has tuberculosis the community is tuberculous. We are dealing with a disease of Smith, Jones and Brown, but also of Smithville, Jonestown and Brownburg. It is a seamy side of the complicated fabric we call our civilization. Cure for the sick man—compassion first—may make the stronger appeal, but cure for the infected community—safety first—pays the bigger dividends. Cure is good, but prevention is better. But, fortunately, the cure of the sick man is an essential part of the cure of the infected community. Still, there are the two interests, and if they should ever clash the interest of the community is paramount. In short, tuberculosis must be dealt with from the health officer point of view. However widely it may differ from smallpox, it is really in the same class, and perhaps almost as infectious. What hope would there be of stamping out a smallpox epidemic if we were to sit in our offices and wait until the diseased men one by one would come to us saying "I am sick and need treatment," and then still longer until a heavily burdened voluntary agency said "Yes, we will put him on our waiting list." The smallpox patient safely in hospital is the least of the health officer's worries. And the getting of a tuberculous man to sanatorium is but the beginning, not the end, of our job. Public health is more important even than private cure. Life comes from life, wheat from wheat, tares from tares, and tuberculosis from tuberculosis. If the springtime fields of a new generation show tares among good grain it is because harvest fields of an old generation have scattered the evil seeds. If this generation could thoroughly deal with all its tuberculosis the next would have none to deal with. There will be disease and death from tuberculosis tomorrow just in proportion to the infection that slips through our fingers into families and communities and through the whole land to-day. It is within the power of man to banish this seed propagated disease from the earth.

Twenty years ago we saw chiefly the adult. Now we know that in tuberculosis, as in life, the child is father of the man. The battle of Waterloo may or may not have been won on the playing fields of Eton, but certainly the battle of tuberculosis will be won chiefly in the schools and among the children of the country. Prevention must begin *when* infection begins—that is usually in early childhood; and prevention must begin *where* infection begins — that is usually in the home.

The family spread of tuberculosis is very impressive. The harvest is reaped where the seed is sown. Twenty years ago we were trying to get out of the heads of people the idea of a tuberculosis Fate that followed from father to son. To-day we are trying to get back into their heads the idea of disease tendencies transmitted before birth, and that the family circle the child is born into, lives and crawls in, and is hugged and kissed in, is the chief spreading place of tuberculosis. Ultimately we should aim at the whole community, but in the meantime we can get most out of limited ammunition by aiming at the narrower mark of known contacts and known suspects. Rathbun found nine diseased among contacts for one among non-contacts. So it is the contacts we should seek first, letting the general population be added unto us. If a spreader be known, the search is for the infected contacts; and if infected contacts be found, the search is for the spreader, usually an adult. Tuberculosis is usually passed from an older generation to a younger, so suspicion should fall upon parents and grandparents, uncles and aunts, and of course upon close associates of any generation.

The search among contacts for early disease needs, as Burton Wood has it, even more than "the imagination of a poet, the ear of a piano tuner, and the touch of an osteopath." Here more than anywhere else Burrell's advice "Put not your trust in physical signs" is wise. Tuberculin and the wisdom of long experience will help, but an absolute necessity is the well taken, well read x-ray plate. But the plates we sometimes see, which Bardswell aptly likens to "a myope's impression of a November fog," are crimes against medical science and sick people. One of the greatest of medical teachers of all time has been the x-ray plate, a teacher of early diagnosis, of pathology, of chronicity, and of classification, especially in children. And it has given us almost a royal road to Hippocrates' long art of prognosis. Tuberculosis is truly an insidious disease. It can be, like an iceberg,

only one-tenth visible and nine-tenths invisible, and with occasional "growlers" scarcely visible at all. Human vision alone cannot always prevent a *Titanic* horror, but science is giving to ships under-water eyes and ears and senses that can. The best eyes and ears so far devised for the submerged nine-tenths of tuberculosis is the x-ray plate. The Laennec of the twentieth century is Roentgen.

We all know that early tuberculosis does not find itself but has to be hunted for. And really moderately advanced disease has to be hunted for also, and even far advanced disease—otherwise it staggers in hopeless after infecting family and community. To trust to the initiative of either infected or diseased persons is not good enough. If tuberculosis is to be conquered there must be missionary work, that is, something done by those who see a need for those who have a need but do not see it.

Such things have been known as a sanatorium standing half empty in a community full of tuberculosis. In Canada, with less than one-fourth Great Britain's population and more than forty times its area, clinics have, literally, to go out into the highways and compel them to come in that our houses may be full. Each province has its own favourite model of travelling clinic; in Ontario a full-time Provincial Health Department team; in Saskatchewan the family doctor doing much of the work under sanatorium supervision; in Manitoba extension work done by the Sanatorium and its staff. A sanatorium, at any rate, is a suitable base for clinic work. Here are erstwhile spreaders, now patients, from whom clues can be followed to contacts. It will do the sanatorium man no harm to leave his orderly routine and rows of white beds occasionally to see the homes his patients come from and go back to. And an occasional "refresher course" in the more orderly sanatorium procedures will do no harm to the man who has been on the road. Sanatorium and clinic staffs can very well be interchangeable. And we consider the x-ray plate indispensable in all clinics, travelling or stationary.

The newer idea of going out to find the man before he gets sick enough to find himself does not by any means lessen the importance of the sanatorium. Community safety demands the treatment of tuberculous people as early, as late, and as long as treatment is necessary. It demands the segregation or effective supervision of spreaders while they are spreaders, and as soon and as long as they are spreaders. Community safety thus demands many more beds than most of us have at the present time—beds waiting for people, not people waiting for beds. What is the use of finding sick and infective people if we can just wish them well and leave them as we find them? Beds have many uses, for treatment, for observation, for a check over, even for a short holiday rest for those able to carry on with a very little help, beds for childbirths, beds at night—the night sanatorium idea —for those who can, thus helped, be ordinary working people by day. The very foundation of the prevention of tuberculosis is *beds*. Sanatorium beds, it is true, can be wasted. One great drain upon them in this newer country is patients who are practically homeless or become homeless when ill, and so can scarcely be sent out until able to carry on. Others have a home environment very unsafe for them, while others are very unsafe for the home environment. Between a profitable expenditure of bed days and a waste the lines are often very hard to draw. The patient with a suitable home is an easy problem.

How to make the punishment fit the crime is a matter for daily study, that is how to fit to each individual case and each separate necessity its exact kind and grade and amount of treatment and help; how to avoid alike the tragedy of under-treatment and the waste of over-treatment. I think we all avoid many of our older mistakes of promising cure too soon since we began to use the x-ray plate as our measuring stick of progress rather than temperature or weight or appearance. I am sure we all believe that thorough going, ample treatment of early disease is one of the best expenditures of sanatorium facilities; and that advanced active disease needs also a very liberal allowance of bed care, with all such adjuncts as pneumothorax, phrenicotomy, thoracoplasty, heliotherapy, etc. Such expenditures pay both in salvage of lives and community protection.

But having tuberculosis, and suffering from tuberculosis are two very different things. Chronicity, resistance and activity are difficult to estimate. We have seen the brigade kept on duty long after the fire was out, with no

apparent purpose but trying to restore destroyed beams and rafters, trying, that is, to do the work of carpenters and not of brigades. A man with fairly chronic, fairly resistant disease, and a temporary exacerbation, may sometimes be brought back to his maximum by a month of treatment as well as by a year. He is an old shoe that can never shine again as it was wont on Princes Street or Piccadilly, but yet with an occasional patch upon a patch may wear along serviceably for many years. When that occasional patch has again been put on the sanatorium shop has performed its function and there are other and cheaper ways of adjusting the resultant "job" to the rough ways of life than to keep it lying constantly on the work bench. We appreciate fully the value of pneumothorax as a cure, but sometimes fail to appreciate its use as a splint, which, as with a broken bone, can allow much earlier return to activity. In the last twenty years we have learned to put more hospital days to good use; in the coming years we should learn to save some other hospital days from uneconomical use, or from waste. We who work in hospitals and sanatoria are stewards of the community purse. This is our great trust, to get for each dollar spent a dollar's value or more in prolonged lives, community safety, or necessary custodial care given.

Sometimes our patient when he leaves us is able to make his big step back to home and work unaided. Sometimes part time employment at the sanatorium prepares him for the big step. But no sanatorium has ever quite enough stepping-stone jobs. Should it have an industrial annex to provide more? Certainly, when the sanatorium almost forces patients in it should at least follow them out. In Canada I am convinced that the colony plan entire is not the solution, though the principles of some established colonies may well guide us and their spirit enthuse us.

A sanatorium should find work and interests both inside and outside its walls, and should have its own territory and parish. It cannot be self-contained, like a ship at sea. Its doors should swing freely inward to all who come for help, and just as freely outward with help to those who do not come and do not know their need. It is not a work of supererogation for a sanatorium to be a missionary in its community, but one of its principal duties. It should be a part of a scheme, and can very well function as centre of the scheme. It is not just a house, four walls and a roof: it is a work. It is not merely a pile of bricks and mortar, it is a group of earnest and capable men and women. It is not only a place and a name: it is a source radiating energy, a school, teaching and training, an influence, a living soul.

In twenty-five years we have lost some of our old dividing lines. We spoke then with some confidence about "curable" and "hopeless" cases. Now we know better the early that are hopeless, and the late that are curable. We do not look askance at the man with far advanced disease, but count him our average patient. What with hospital facilities in sanatoria, with pneumothorax and double pneumothorax, with cutting of the phrenic nerve and surgical collapse of the bony thorax, with closer diagnosis and longer treatment, with intestinal tuberculosis diagnosed before symptoms appear, with the tuberculous larynx diagnosed from the chest upwards rather than by the laryngoscope downwards, with treatment guided by films as well as by symptoms, with greater emphasis on prolonged rest and less on exercise, disease that would have been hopeless twenty years ago gives a good outlook, or, at any rate, a fair fighting chance to-day.

While patients are with us as scholars in our school, or even, perchance, almost as prisoners in our wards, we are trustees for all that concerns them. And I firmly believe it is one of the many duties of that trusteeship to find, or even prescribe, some occupation for every patient we have who is fit for any occupation whatsoever. There should not be too much sugar-coating either, for the strong taste of duty should be at least recognizable in them, and they are indicated for the moral backbone quite as much as for the physical focus. For the ordinary sanatorium that means small jobs for the many, rather than large jobs for the few. In Canada I think most of us have drifted away from spades and pruning books and wheelbarrows, and even from workshops, for an ordinary sanatorium population. For carefully selected patients, or some sanatorium graduates, or with the medical routine definitely focussed on that very phase of treatment, they can undoubtedly be of signal use. For the

ordinary run of patients in bed, or barely ambulant, or even on some exercise, the best kind of occupation we have ever tried is study. It is the most universally useful, the easiest to begin, the cheapest to get tools for, the most varied, the most adaptable, the most convenient—for every bed can be a school—and even, by all odds, the most popular. We simply could not get along here without our school—or rather schools—for we have three, day and bedside schools for patients, and evening school for staff. To have school and study interests pervading patients and staff instead of idle hands and heads for which Satan is supposed to find employment, and usually does, is in itself a very great and worth-while gain. Educational advancement and cultural development are well worth while; moral tone and discipline, even self discipline, are even more worth while. There is no tonic like duty. It is true that, like other tonics, duty in overdose may become almost a poison, but we try to reach in each case, and not to exceed in any, the optimum therapeutic dose.

After food and safety, health is the most fundamental need of the community. After food and safety, therefore, health should be the chief concern of governments. Voluntary agencies must often blaze trails for governments. But if the people need a fundamental service, and no other means is at hand to supply it, the service becomes a government responsibility. It may not always be the duty of the state to pay, but it is almost always the duty of the state to plan. The residual responsibility for the care and cure of disease, in measures for the bettering of health, is upon the state. Twenty or twenty-five years ago anti-tuberculosis effort was largely voluntary, the hobbies of a few enthusiasts, with intelligent governments, general and local, not much more than dropping the mite, as ordinary citizens might do, into the collection plate. But the anti-tuberculosis program of to-day cannot be carried on by any private agencies. It is a bit of public health that needs public measures. Tuberculosis is as much a community responsibility as typhoid fever, or small-pox, or lues. In Britain these principles are much better accepted than in Canada. In the old land voluntary agencies help the government with *the government's* tuberculosis job. In Canada, still pretty largely, governments help voluntary anti-tuberculosis agencies with their voluntarily carried job. The British expect a principle fully established to-day to be applied practically to-morrow morning. We scarcely trust our governments to put new principles into practical measures without a generation of talk.

Whether the man himself is considered, or the state, it is a principle of prime importance that poverty must not be allowed to stand in the way of the timely diagnosis and treatment of tuberculosis. And as the most of us, and possibly the best of us profess neither poverty nor riches, but live in one of the various middle states, it is even more important that timely diagnosis and sufficient treatment shall be priced so that we can, and will, afford them. In a disease so insidious the diagnosis is apt to be postponed, and in one so long-drawn-out the treatment cut to the quick, if payment is made a burden. When a man with far advanced disease perhaps hopeless, is found and sent to the hospital, who, after all, is it that benefits most? The man himself might even prefer to carry on as he was. Treatment and segregation may mean to him something like unwilling imprisonment. The greatest gain is to the community. Almost everything we do is partly for the man's good and partly for the safety of people in general. In so far as the man is treated to make the state safe, it is nothing but right that a state should pay.

The costs of tuberculosis prevented and cured are tremendous, but a mere trifle compared with the costs of tuberculosis neglected. It is one of the greatest of all makers of poverty, and nothing is so wasteful as to treat poverty merely as poverty, to treat its symptoms rather than its causes. When a focus of tuberculosis is healed a focus of poverty is cleared up, and in the best way, by removing causes. True, people are paying increasingly more taxes for defensive and offensive measures against tuberculosis, but they are getting increasingly more for their money. The alchemy of the middle ages tried to transmute base metals into gold. The alchemy of our day can do better. It can transmute the dollars and cents of taxpayers' money into something much more wonderful, more precious and more beautiful than gold—better health and fuller life for men, women and children.

Twenty years ago or more tuberculosis was seen as a special problem to be dealt with specially, with only a sort of cousinly relationship to general Public Health or Sociology. Now we know that no vine in the jungle is more intertwined with other vines than tuberculosis with all ills of the community. As Roatta has said, anti-tuberculosis measures begin with the art of healing and proceed toward sociology. In most communities the anti-tuberculosis campaign has accomplished much more than anti-tuberculosis results. It has been the very spearhead of such movements for general betterment as better housing, the better care of children, the idea of disease prevention and of periodical physical examinations, open air living, sunlight's uses for the betterment of health, and indeed of all that makes for bringing disease under man's control. Tuberculosis has been called an "index disease." Where its ravages are great, general living conditions must be bad; and where its death rate is lowering, general living conditions are likely to be improving. A visitant from Mars could scarcely find a better yardstick to measure our civilization with than tuberculosis.

THE MEDICAL STUDENT AND TUBERCULOSIS

In the olden days when a medical student was an apprentice, he learned as much about tuberculosis—or as little—as about any other disease. But when general medical education is centred in colleges and general hospitals, and pulmonary tuberculosis segregated in sanatoria, it comes to pass that the student learns very much less about pulmonary tuberculosis than about other diseases. Yet it is still one of the five or six chief destroyers of human life, not only kills but wounds, infects nearly all people, lies latent in many, and may be a sort of general background to almost any of the ills of life. Mahomet has somehow been separated from the mountain, but fortunately travel is easier than ever before, so he may regain it. Why not bring the medical student to the sanatorium? Any sanatorium worth its salt is worth a medical student's time. He can learn there not only much about tuberculosis but much common sense applicable to all general medicine as well. The sanatorium has a special experience and wisdom about what unrest and hurly-burly, the insults and irritations of environment, bad habits, bad housing, over-work, over-play—in a word, what Sir Thomas Browne might call bad managery—can do to make people sick; and what rest and quiet, air and sun, food and time, routine and discipline, and self-discipline—or general good managery—can do to make sick people well. This experience and wisdom about natural means of cure is a sort of special internal secretion the sanatorium organ elaborates which might very well be thrown into the general blood-stream of the whole body medical. It is needed there.

To have teaching to do helps sanatorium as well as student. Sanatorium anæmia, or asthenia, of which we have heard, or the same diseases afflicting clinics, are well treated by transfusions of students. Students, buzzing like bees from hospital to sanatorium, and sanatorium to hospital, are great scatterers of pollen. Who knows but that something *might* be carried back from sanatorium to hospital, or even, *mirabile dictu,* to the medical school. If the sanatorium is worth doing it is worth doing well, and it cannot be done well unless it teaches. Teaching in a sanatorium transforms hopeless, advanced, discouraging cases at least into useful lessons. Even hopeless illness, and even death, can teach.

The best results, the ultimate results, of twenty years of anti-tuberculosis effort are not the fine sanatoria and hospitals that have arisen, though these have been necessary, and were never more necessary than now. But the best results are within the minds of the people, in their new ideas about this disease, about all disease, their growing conviction that man can master this Fate, and that more and more man can and will control disease. Twenty years ago people were taught by lectures on tuberculosis in the community hall; now they are best taught by tuberculosis clinics in the community hospital. A mother will learn more by bringing her family of contacts for examination than by a whole term of lectures. Above all, we must teach. The community is still ignorant until all are taught, even the dullest and remotest. We cannot march without light. People will not go forward in darkness. We cannot go faster than our people. We cannot drive people, even for their good. The age of dumb, driven cattle is over, at least for our

race. We cannot impose our ideas by force, no faith, however fine, warrants thumbscrew or stake.

We have not won our war; we have just been skirmishing for position. We are not done: we are just nicely ready to begin. We have not solved the problem: we have just tried a few experiments. We have spent millions in patching. Now we are about ready to begin preventing. As Savage would say, we have succoured damaged travellers with food and sun and maintained them at the inn, but now it is time to get out and police the road from Jerusalem to Jericho.

THE PURSUIT OF HEALTH*

By Robert Hutchison, M.D., F.R.C.P.,

London

THE subject on which I have the honour of addressing you to-night is the Pursuit of Health. Lest any of you, however, should have come here under a misapprehension let me hasten to say at once that it is not my purpose to encourage you in that pursuit, nor to lay down rules for your guidance in it. On the contrary, I hold that health—like happiness—is to be found, if at all, by the wayside, and that the more you pursue it the more it flees from you. I agree, in short, with Mr. G. K. Chesterton that "of all human things the search for health is the most unhealthy." The reason for this is obvious; fussiness about health increases fear and impairs the serenity which is the basis both of health and of happiness. The old ignorance about the body and stolid resignation to its ills was probably a more "healthy" attitude, and certainly a happier one, than the modern curiosity and over-anxiety.

This over-anxiety may show itself in one of three ways. First, it may effect an individual as regards his own health and this we may speak of as individual hypochondriasis. Secondly, it may be exhibited, and more pardonably, by normal persons in regard to the health of those near and dear to them—a vicarious hypochondriasis. Thirdly, the over-anxiety may assume an epidemic form, involving whole communities or nations and this I would call national hypochondriasis. I should like now to deal briefly with each of these manifestations.

1. *Individual hypochondriasis* is shown in its most typical form by the man who has a conviction *that he suffers from some disease*—although in fact no sign of the presence of that disease can be found on the most careful examination—and who, even if persuaded by a visit to his doctor that he is mistaken, is not long before he is back again with some fresh imaginary complaint. Such cases are commoner in men than in women. The man who has retired from business is the typical example. Having nothing to occupy his mind he makes his health his hobby and collects new diseases as another man collects stamps. Vanity also comes into it to some extent, for to have an ailment gives one a sense of superiority and importance. Such patients are familiar figures in every consulting room and they make the fortunes of the quacks and patent medicine-mongers. In its extreme manifestation the condition may lead to fixed delusions and even end in insanity, but as pursuers of health of this type are really patients, although their malady is in the mind and not in the body, and as I am not addressing a medical audience, I do not propose to refer farther to them here.

Another common type of the individual hypochondriac is the *crank or faddist*—the man who thinks that health is only to be attained or maintained by some special rule of living—by a peculiar diet or mode of dress, by constant exposure to fresh air and sunlight, by deep-breathing, much water drinking, or non-smoking and so on—you all know the sort of person I mean

* A popular address delivered at the combined meetings of the British and Canadian Medical Associations at Winnipeg, August 27, 1930.

and know also, no doubt, what a bore he can be and how he persists in season and out of season in forcing his fad down other people's throats.

The diet faddist is perhaps the commonest and most malignant example of this type. The form of the fad differs in different persons and in the same person at different times. One swears by whole-meal bread, another by sour milk; vegetarianism is the only road to salvation in the eyes of some, others insist not only on vegetables only, but on eating those raw. At one time the only thing that matters is the energy value of the food and they talk learnedly of calories (I am told that in some American restaurants the caloric value of each dish is entered on the menu): at another time they are crazy about vitamins or about "roughage." Now what is the scientific truth about all this diet business? It may be put quite briefly: eat moderately, taking an ordinary mixed diet, and don't worry about anything else. To take no thought for what you shall eat or drink is wiser than to be always fussing over it. Likes and dislikes, however, should be listened to; they are nature's indication of what probably agrees or disagrees. As to "calories", our appetite was given us to tell us how much food we need and in health is usually a trustworthy guide. Leave raw vegetables, except salads, to the herbivorous animals and let the vitamins look after themselves. Investigation has shown that there is no wonderful merit in wholemeal as opposed to white bread, but take some occasionally as a change. Don't scrape up your inside with much roughage as it is more likely to do harm than good. Remember that fruit, though a pleasant addition to the diet, is not very nourishing and that milk is both bulky and bilious. Vegetarianism is harmless enough, although it is apt to fill a man with wind and self-righteousness, and I have nothing but respect for the conscientious vegetarian, but it is not a mode of diet for all. It is specially unsuitable for growing children and for sedentary workers. Lastly, it is well to remember that few diseases are either caused or cured by diet alone and that, in particular, diet has nothing to do with cancer. Rather than fuss about what you eat and drink I would recommend for health the practice of Methuselah, as described by an obscure American poet:—

WHEN IGNORANCE WAS BLISS

"Methuselah ate what he found on his plate
And never, as people do now,
Did he note the amount of the calorie count—
He ate it because it was chow.
He wasn't disturbed, as at dinner he sat,
Destroying a roast or a pie,
To think it was lacking in granular fat
Or a couple of vitamines shy.
He carefully chewed every species of food
Untroubled by worries or fears
Lest his health might be hurt by some fancy dessert,
And he lived over nine hundred years!"

Yet another type of hypochondriac is the man who has an *undue fear of disease*. He is not afraid that he has got any special disease nor is he a crank in any way, but he is morbidly afraid of disease in general or of some disease in particular, cancer, paralysis and appendicitis being the most popular. Such a man may be spoken of as a Nosophobe. He is usually the product of health propaganda acting upon a naturally anxious temperament and in extreme cases his anxiety may become an insane obsession. Microbes are the special dread of some. As Mr. Aldous Huxley has pointed out, for many people, especially women, bacilli have taken the place of evil spirits. "Microbes are for them the personification of evil; they live in terror of germs and practise elaborate antiseptic rites in order to counteract their influence. There are mothers who find it necessary to sterilize the handkerchiefs that come back from the laundry; who, when their children scratch their finger on a bramble, interrupt their walk and hurry home in search of iodine; who boil and distil the native virtue out of every particle of food and drink." I shall have occasion to point out one evil consequence of this attitude later, but meanwhile I would only say that it is not the way to pursue health of body or peace of mind.

Last amongst the individual hypochondriacs are those who are not afraid either that they have a disease or are likely to get one, but who have an *impossible standard of health* or what they call "fitness". They want to be "utterly fit", as I once saw it put in a popular health magazine. These are mostly young men and may be described as physical prigs. We all know the intellectual prig or highbrow and the moral prig who makes "his moral being his prime care", but there are also physical prigs who make the health and development of the body their first thought. Exercise is the god

of such men and the late Mr. Sandow or Major Müller are their prophets. They are the sort of people who do physical jerks to wireless accompaniment and who are always feeling their muscles and bragging of being "in the pink". Now exercise is all very well if taken for pleasure, but not if done as a duty, and hard exercise, if prolonged into middle life, may very well be injurious, especially to the heart. (A friend of mine who had returned from America told me that what struck him most there was the number of motor cars and the number of sudden deaths on the golf links). It may be said of these devotees of exercise, in the words of the epitaph, "I was well, I wanted to be better, and here I lie". It may be doubted in any case whether a maximum degree of physical development—the drill sergeant's ideal—is good for health and there is certainly no reason to believe that athletes are particularly healthy or long-lived persons. Nor does a high standard of physique necessarily make one more efficient or mentally alert. Experiments on rats, indeed, have shown that underfed and stunted animals are quicker at learning their way through a maze (the intelligence test for rats) than normally fed and normally growing controls. It may be that the exercise business, like the feeding business, is being overdone and that tissues which have grown less exuberantly may function more efficiently. Certainly the search for health along the lines of maximum physical development is a mistake. Your Canadian humourist, Prof. Leacock, has described this type of health seeker amusingly and with shrewd sense in an article entitled "How to live to be 200" —perhaps some of you know it. He says:—

> "They get up at impossible hours. They go out in silly little suits and run Marathon heats before breakfast. They chase around barefoot to get the dew on their feet. They hunt for ozone. They bother about pepsin. They won't eat meat because it has too much nitrogen. They won't eat fruit because it hasn't any. They prefer albumen and starch and nitrogen to huckleberry pie and dough nuts . . . . . And after all their fuss they presently incur some simple old fashioned illness and die like anybody else."

2. I wish to pass on now to speak of those who do not pursue health for themselves but who are *over-anxious about the health of others*. Parents in regard to their children are the typical instance. There is no doubt that parental over-anxiety about health is increasing. As so many parents nowadays have all their eggs in one, or perhaps two baskets, they naturally tend to fuss over the basket to a morbid extent. The fuss begins at, or even before, birth and is continued throughout childhood. The rearing of an infant is now regarded as a job requiring the combined knowledge of a chemist, a psychologist and a public officer of health. Children are weighed at frequent intervals and their temperature is taken daily. If the mother is one of the new type of professional mothers, a student of "mothercraft" and a nursery blue-stocking, she probably keeps a journal in which all the events of the child's development are duly noted down. Most likely also she gets a book on child psychology and experiments on the tender mind of her infant. There is even an American book describing physical exercises for infants of five months! In another class of life the infant goes regularly to a welfare centre and later passes into the hands of the school medical service. You say that all this has resulted in a great decline in infant mortality. I admit and rejoice at the decline but I am not so sure of its being due to the excessive care bestowed on the children's health. If I had time I could make out a case for its being the result of the replacement of the horse by the motor-car or of the invention of dried milk. Anyhow, it is far from certain that the surviving children are either healthier or happier than their predecessors of a more careless generation. Gone are the days of the mud-pie, for unhygienic behaviour has become a new form of naughtiness. It is a bad sign, too, that the modern child is no longer greedy—in fact it is often difficult to get him to take any interest in food at all. I believe, indeed, that children are not such good animals as they used to be, in spite, or perhaps because of all the care that is taken of them. Be this as it may, there is no doubt that the atmosphere of fuss and anxiety in which so many children are brought up reacts upon them unfavourably, for children are extraordinarily sensitive to their psychological surroundings, with the result that nervous troubles of one sort or another are commoner to-day in childhood than they ever were.

I have already referred to the fear of microbes and I should like to say here that the morbid dread of infection and the care which is taken to shield children from it is having the bad effect of preventing their having the usual infectious diseases of childhood at the proper time.

The best time to have measles, whooping cough and the other childish infections is between the ages of 5 and 10. At that period they are less dangerous, but if they are postponed until late childhood or adolescence they are both more perilous and more inconvenient. Yet that is what is happening now, especially in the upper classes. It would be all right to protect children from infection if there was any chance of their *permanently* escaping it, but there is no such chance and I would therefore encourage the taking of these diseases at the proper time.

I would say to you do not worry too much about the health of your children. Give them happy homes, with the companionship of other children and plenty of plain simple food; do not take too much notice of them, send them early to bed and leave the rest to chance.

I have spoken of the over-anxiety of parents about the health of their children, but one also finds children who are too fussy about the health of parents. How often, for instance, is the life of an old man made miserable by the well meaning interference of a daughter who looks after him. Father must not smoke an extra pipe—it is bad for his heart; he must not sit up to finish his game of bridge—he needs sleep; he must not go out to-day because he might get bronchitis—and so on. Now is all this anxiety worth while? It is all very well "to husband out life's taper at the close, and keep the flame from wasting by repose", but is this particular game worth the candle? Would the old man or woman not prefer a shorter life and a merrier and in any case, if they were happier might they not also be healthier? I plead therefore for reasonable liberty for the aged to do what they like about their personal health, for I hold that the utmost possible prolongation of life for the sake of merely continuing to exist should not be the object of a rational being.

3. Lastly, I come to over-anxiety about health as it effects whole communities, *national hypochondriasis*, as we may term it. Here again I must ask you not to misunderstand me. I have, of course, nothing to say against what may be termed municipal hygiene—the provision of a pure water supply, good drainage, the prevention of the adulteration of food and so forth. All that is the clear duty of any government, national or local. What I am doubtful about is the wisdom of trying to make all the members of the community anxious about their individual health — creating a "health conscience" as it is called . It is easier to create this "health anxiety", as I prefer to term it, in some communities than in others. The Jews, for example, seem specially prone to it. I often think that it was a pity Moses ever laid down a sanitary code for the children of Israel, for it has implanted in them the seeds of hypochondriasis, which have flourished ever since. America is another country which seems to offer a congenial soil for the health propagandist, but there is scarcely any country to-day in which efforts are not being made to arouse interest in (and anxiety about) health. You are all familiar with the machinery by which it is sought to create this interest—health societies, "health weeks", popular lectures and articles, booklets, leaflets, slogans, and, in short, all the familiar apparatus of the advertiser. The legislature also helps in the work. We have in England, as you know, a national insurance system against sickness, which has been in operation now for some years. Lately alarm has been caused by the steadily increasing rate of claims for sickness in spite of a falling death rate, and various explanations of this deplorable state of affairs, have been put forward. I think, however, that there is no mystery in the matter, for it is well known that if you make it worth people's while to be ill or at all events, if you see that they suffer no great economic disadvantage from illness, then ill they will be. In other words, you can have as much "sickness" in a community as you are prepared to pay for. There has lately been a movement, especially in America but it has spread to England, and, I understand, to Canada also, in favour of what is called periodical medical examination. This seems at first an attractive plan and I know that many medical men are in favour of it. The idea is that diseases may be detected in their early stages and corrected before they have gone too far. That this would happen sometimes cannot be doubted, but there can be equally little doubt that most of the defects which such examination would reveal the patient had far better know nothing about. At an examination of this sort, of 300 business men in New York, it was found, I think, that not one was free from some defect or error of hygiene! I can well believe it and I expect

the same would have been true of the examiners. "There is none that doeth righteousness, no not one". In everyone, after a certain age, the machine shows signs of wear and tear, but although the paint is a bit scratched and a cylinder misses occasionally, it is wonderful how it gets along, if one does not worry too much about it. You all know what happens to the motor-car of the man who is always lifting up the bonnet to tinker with the engine —making a periodical inspection of it. The wise plan, I believe is, if you feel anything wrong in the working of the machine, to go to the family doctor, who is the mechanic whose business it is to put it right, but otherwise to think as little about it as possible. There is a good deal of nonsense talked about the detection of the beginnings of disease. Most diseases either *cannot be detected early,* or, if they are, little can be done to stop them unless one is prepared to give up for the sake of life all that makes life worth living. That, ladies and gentlemen, is my own view about the question of Periodic Health Examination, but, as I indicated before, I am aware that many of my professional colleagues, whose opinion I value, do not agree with it and consider that such examinations are worth while. Perhaps the truth of the matter is that everything depends upon the individual. If you feel that it would be a comfort to your mind to be overhauled at regular intervals, and if you are sure that you are not going to be made anxious by any defects that may be discovered, then by all means go in for it; otherwise you had better leave it alone.

I believe that most health propaganda is based on two fallacies; one, that health is difficult to attain and keep, and the other that it can only be got by following certain "rules". As to the first of these fallacies, I agree with one of the most distinguished living English physicians (Sir Thomas Horder) when he says that the way of health is too often regarded as a tight rope along which we make a slow and trepidating progress, the least bias to one or other side plunging us into an abyss. The truth, on the contrary, is, as he says, that, "Health is a broad and well paved road; nature is both an excellent road maker and road mender. Not only does it require very little skill and but a modicum of good fortune to keep to it, the wayfaring man must be a fool indeed if he errs therein."

The other fallacy is that health is only to be got by those who know the rules. Now the fact is that there *are* no rules which apply to every individual. One man's meat is another man's poison and one man's rule of health is another man's rule of death. Even if there were such rules as we often see laid down, no one could observe them and keep his job. Doctors surely should, if anyone does, know and observe the "rules", but the fact is that ours has the highest death rate of most occupations and we set a noble example of careless living.

I know, indeed, only one health rule which is universally applicable and it was laid down by the Apostle nearly 2,000 years ago, when he said "He that striveth for the mastery is temperate in all things." *Moderation*—that is the universal secret of health, but it is, I am afraid, too old and too dull to cut any ice as propaganda. Moderation in all things, be it observed, in food and drink, in work and in exercise, in smoking and in sleeping — moderation even in being moderate, for an occasional departure from the strict rule of moderation is probably good for health. If you ask me what constitutes moderation in your particular case, I cannot tell you; you must find out for yourself and abide by the result of your experience.

All this "safety first" attitude to life is not only cowardly but I believe that it defeats its own end. How different is the brave counsel of that plucky invalid Robert Louis Stevenson:—

"To be deeply interested in the accidents of our existence, to enjoy keenly the mixed texture of human experience, rather leads a man to disregard precautions and risk his neck against a straw. For surely the love of living is stronger in an Alpine climber roping over a peril, or a hunter riding merrily at a stiff fence, than in a creature who lives upon a diet and walks a measured distance in the interest of his constitution.

"Whether we regard life as a lane leading to a dead wall—a mere bag's end, as the French say—or whether we think of it as a vestibule or gymnasium, where we wait our turn and prepare our faculties for some more noble destiny; whether we thunder in a pulpit, or pule in little atheistic poetry-books, about its vanity and brevity; whether we look justly for years of health and vigour, or are about to mount into a bath-chair, as a step towards the hearse; in each and all of these views and situa-

tions there is but one conclusion possible: that a man should stop his ears against paralyzing terror, and run the race that is set before him with a single mind. . . . .

"It is better to lose health like a spendthrift than to waste it like a miser. It is better to live and be done with it, than to die daily in the sick-room."

What we need for the attainment of health as individuals is not more knowledge but a change of heart. We hear catch phrases about a "Nation's health is a nation's wealth", "Health is the country's greatest asset", and so on. Believe me that is cant. A country's greatest asset is character. Let us therefore cultivate character and let health look after itself, being assured that to a nation made up of men and women of character, all things, health included, will be added. For it is true, I believe, in the bodily as well as in the spiritual sphere that he that will save his life shall lose it.

ANALGESIA AND ANÆSTHESIA IN CHILDBIRTH*

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A CONSIDERABLE amount of discussion has been taking place in Britain as to the necessity for the provision of treatment for pain in so-called normal labour. Among medical practitioners the subject is a somewhat controversial one. It is obvious that one of the first principles of treatment in medicine is that when pain is present it should be relieved as soon as possible. Some, however, maintain that the pain of childbirth is an exception, and that any effort towards its relief is against the will of God. Had Sir James Simpson been influenced by the ecclesiastical arguments of his day we might not have had the benefit of chloroform narcosis in obstetrics or in surgery. In obstetrical practice it should be an axiom that pain should be relieved in every case when it does not interfere with the safety of the mother or child.

Anæsthesia in cases of complicated labour is a necessity when operative measures are indicated. This is not a controversial subject. It is in cases where labour, although looked upon as normal, is accompanied by pain and suffering that women now demand relief. How far with safety can we give freedom from pain? A painless labour can never be safe, but a very considerable modification of suffering is within the scope of treatment of every practitioner. In the past little attention has been paid to the subject, but now women refuse to submit to the sufferings borne by their mothers and grandmothers. Not only do they demand relief for themselves, but in London a large and influential group of members of the public is providing resident anæsthetists for various maternity institutions, in order that the patients should be given relief, and that students and nurses should be trained in the advantages of childbirth conducted by humane methods of treatment. The agony of childbearing is almost worse than any other suffering, and there must be some reason why the average practitioner does so little for its relief. In the first place, little is known as to the risks of the administration of drugs in labour. Also, if analgesics and anæsthetics are to be given, they entail an additional expenditure of time on the part of the medical attendant. They also involve skilled assistance in many cases, and the expense may be almost prohibitive except for hospital patients and the well-to-do. But the question must be discussed and some solution found, since the public is insistent in its demand.

Sedatives tend to prolong labour rather than shorten it in many cases, by diminishing the expulsive forces of the uterine contractions. This adds to the risks of labour for the mother, but more especially for the child. We must therefore have a thorough knowledge of the action of sedative drugs, and only employ those

* A paper opening a discussion in the Section of Obstetrics and Gynæcology at the combined meeting of the British and Canadian Medical Associations, Winnipeg, August 29, 1930.

which give the maximum of relief with the minimum of danger. The problem is intensified by the fact that childbirth differs from a surgical operation. Much depends on the temperament of the patient, her environment, and her uterine contractions. The process of labour is prolonged in comparison with surgical conditions, and two lives have to be considered. Some women have little or no suffering; others under the same obstetrical conditions suffer acutely. Each case must be treated individually, and experience and caution are necessary.

In the Report of the Government Departmental Committee on the Training and Employment of Midwives, which was issued in 1929, it was urged that some professional body should make a pronouncement as to the advisability and place in labour not only of anæsthetics, but also of analgesics and sedative drugs in general. A response was made by the British Medical Association, and a report of a committee was issued in April, 1930. The main expression of opinion was that of caution, and that any further expansion of the uses of anæsthetics and analgesic drugs in non-operative cases would be associated with danger to the mother and child. The question was left very much as it had been. The report may be of value in view of the present public agitation favouring the indiscriminate use of anæsthetics in all midwifery cases, but it does not give much help or encouragement to those of us who are anxious to relieve suffering whenever it is possible in obstetrical practice.

The opinion of this committee will be referred to later with regard to the use of special drugs. It is by frequent discussions between representative members employed in the practice of anæsthetics in obstetrics and in general practice that we shall in time gain useful information as to the most suitable methods to employ; we may eventually find the perfect method which will give complete relief without any risks to the two lives concerned.

The problems for discussion are the management of the stages of labour; the most suitable analgesics and their dosage for the first stage, and those for the second, combined or not, with anæsthetics; the differences between institutional and domiciliary practice; and the expense involved. We have also to consider the primary question: is relief of pain necessary in so-called normal labour? What are the dangers, complications, and the effects upon uterine contractions, retraction, and post-partum hæmorrhage?

Although analgesia and anæsthesia may involve risks to the mother and child, I am firmly convinced that a considerable amount of our maternal death rate is due to lowered resistance from excessive fatigue, shock, and sepsis, the result of withholding relief during labour. In my clinic, where for the last nine years the use of sedatives, and, when necessary, light anæsthesia for the second stage and during delivery, is almost the routine method of treatment in ordinary labour cases, the patients are remarkably free from fatigue at the end of labour, and in a few hours show very little trace of their experience in the labour room. Mental suffering, especially fear, has an effect in lowering the resistance to shock and to sepsis. I am convinced that better results in the management of labour and in the reduction of maternal mortality will be gained by much greater attention to the relief of suffering in labour. Puerperal insanity can to some extent be prevented by the abolition of anxiety and suffering.

ANALGESIA IN LABOUR

Analgesic or sedative drugs are administered in the first and second stages of labour, since pain is relieved without the loss of consciousness in most cases. Anæsthetics are employed to abolish consciousness, and they are used intermittently in the later second stage, while deeper anæsthesia is used during delivery. Deep anæsthesia is employed where operative measures are necessary.

In the first stage of labour no sedative, as a rule, is required until labour has become established and the patient is conscious of the discomfort of the uterine contractions. The general condition of the patient has to be considered, and also whether she is suffering from pain or only from anxiety and dread of the ordeal in front of her. Pain is felt in the back and abdomen, and she is restless and disturbed. The drugs most usually employed in the first stage are chloral hydrate, potassium bromide, opium and its derivatives, scopolamine, and numerous other sedatives, in combination or alone.

Chloral hydrate.—Chloral hydrate in doses of 10, 15, or 20 grains is given by the mouth, or by the rectum in some cases; it is repeated as required. This is the rule for most sedatives in labour; no fixed time can be laid down, since patients and uterine contractions vary so much, but when pain is not present no sedative is necessary. Chloral hydrate is usually combined with 10 to 30 grains of potassium bromide given in sweetened water. There is almost no risk to the mother or fetus, the cervix is softened, and labour progresses although the patient may be asleep. The doses can be repeated during the second stage.

It is said that free bromine in the stomach may cause undue sickness. Plenty of water should be given during labour in all cases. Sometimes the effect of these drugs is slow, or of little benefit, and other drugs have to be resorted to.

Opium.—Opium and its derivatives have been used from time immemorial. This drug is an ideal sedative from the patient's point of view, inducing restful sleep, arousing no anxiety or discomfort, and aiding dilatation of the cervix, and therefore exercising a beneficial influence on the progress of labour. It is most valuable in the slow dilatation stage in primigravidæ. It rests a tired uterus, and contractions begin again with renewed energy. Opium itself, in the form of the tincture or liquor, is not pleasant to take, and it may cause excitement or sickness. Its derivatives, such as morphine sulphate, omnopon or opoidine, panopin, are much more efficacious in their results if given hypodermically in doses of 1/6 to 1/4 grain. Dissolved in a 50 per cent solution of magnesium sulphate and injected into the buttock the effect is prolonged. The magnesium sulphate can be repeated without the morphine, and the sedative effect is prolonged.

With such an ideal sedative, why try any other? It is said that the effect of morphine upon the fetus is fatal in some cases, and its administration is limited to the first stage, or at least not within three hours of delivery. I have used omnopon for many years in the first and early half of the second stage of labour, and I have rarely seen any ill effects from its use. The fetal heart requires constant auscultation during its administration in the second stage. It accelerates labour, and frequently obviates operative intervention. It relaxes the pelvic tissues, and prevents the patient inhibiting her muscular activities, but it requires to be given by experienced practitioners. Browne, in the examination of 300 fetal post-mortem examinations, found that four deaths could be traced to morphine administration in labour.

Scopolamine-morphine. — Scopolamine-morphine—twilight sleep—introduced by Kronig and Gauss in Freiburg in 1907, caused a wave of enthusiasm among obstetricians, but its use was so mixed up with advertising commercial interests outside the profession, and so little was known as to its effects and dangers, that the number of practitioners who still employ this method is somewhat diminished. It is not used extensively in Britain, America, France, or in Germany. The advantages of the combination of these drugs are that pain is relieved, and the patient has no recollection of any suffering. There is no marked ill effect upon the patient. The uterine contractions persist, progress in descent of the fetus takes place, and there is no additional risk of post-partum hæmorrhage. The third stage of labour is shortened. The scopolamine-morphine must be given early in labour, since it is more difficult to narcotize the patient if she has had experience of severe pain. Most obstetricians give only the initial dose of morphine (1/6 or 1/4 grain), and repeat the scopolamine in varying doses—1/150, 1/200, or 1/450 grain—as indications arise. The chief indication is obtained by means of testing the patient's memory of various objects given to her to recognize. Scopolamine can be repeated up to delivery.

The disadvantages of this method are numerous. It is essentially a form of treatment for the hospital or nursing home, since it requires isolation, complete quietness, and skilled and constant attention. There is sometimes considerable excitement on the part of the patient, which may cause anxiety to her relatives if the confinement is conducted in her own home. She may suffer from thirst, headaches, giddiness, and eye symptoms.

The chief objection is that the fetus may become affected, and a stillbirth may result; most practitioners put this down to the initial dose of morphine. When successful the method seems ideal, but it can never become wide-

spread, since it involves too much expenditure of time on the part of the practitioner, unless he has a special department with an experienced staff.

Scopolamine-morphine is not suitable if the labour is prolonged, or if operative delivery is necessary. Hyoscine is sometimes substituted for scopolamine, but it tends to prolong labour and to cause post-partum hæmorrhage. A modified method of giving small doses of scopolamine during labour relieves pain to a great extent without inducing loss of memory; this does not require such constant attendance, and gives good results.

Adaline.—Adaline is valuable, given in doses of 5 to 10 grains by the mouth. I have had considerable experience of its use, and have seen no ill effects. It is easy of administration, and relieves pain in both stages of labour.

ANÆSTHESIA IN LABOUR

Although we look upon anæsthetic drugs as those which are usually administered by means of inhalation, there are other more local methods of obtaining relief from pain in childbirth, just as there are in surgery. It is somewhat difficult to classify the various anæsthetic drugs, since they differ according to their methods of administration.

The chief inhalation methods are those by means of chloroform, ether, and nitrous oxide gas.

Chloroform. — The administration of chloroform in surgical and obstetrical practice seems to be more or less geographical. In Scotland, the home of Simpson, it is more used than in England, where ether is the anæsthetic of choice. Some practitioners prefer ether for surgical operations, but show a partiality for chloroform in obstetrics. It is said that a pregnant woman is very tolerant of chloroform inhalation, and that it does not require such a skilled administrator as in the case of surgical conditions. This is probably due to the fact that chloroform anæsthesia is, as a rule, light and intermittent during labour—*à la reine*. Indeed, during the second stage, chloroform can be given by the patient herself in some cases. The usual method is to give a few drops on a mask and let the patient gently inhale it. As delivery approaches, the quantity administered is increased according to the degree of anæsthesia required. During expulsion, the most painful part of labour, complete anæsthesia may be necessary in some cases. In the third stage of labour it is not necessary to give an anæsthetic unless manual removal of the placenta is to be undertaken. For the satisfactory repair of lacerations it is, as a rule, necessary to anæsthetize the patient.

Chloroform has a soothing effect upon a nervous patient when given only in minute quantities in labour. It often causes the pains to become more regular, and it relieves spasmodic contractions of the perineum and other structures due to the fear of pain on the part of the patient. The more rapid advance of the presenting part can be observed in cases of light chloroform anæsthesia. During delivery more control is obtained, and therefore the risk of lacerations is diminished. The effect of an anæsthetic relieves to a great extent the anxiety of the patient's relatives.

The disadvantages of deep chloroform anæsthesia are difficult to estimate, since other factors, such as operations and complications, are usually involved. The uterine contractions may be diminished or abolished with the consequent prolongation of labour and the possibility of post-partum hæmorrhage. Chloroform is contraindicated in cases of liver involvement, such as acidosis, toxæmia, and hepatic atrophy. In eclampsia chloroform is given to allay convulsions, but, if there is any serious liver involvement, its administration is accompanied by risk, and chloroform poisoning may ensue. In cardiac conditions chloroform may cause collapse and death; this is more frequent after delivery than during labour. The fetus is not much affected by chloroform unless the administration is prolonged or deep. It is said that chloroform is partly eliminated by the expulsion of the placenta. It should not be given in a room with a gas fire, since decomposition of its elements may occur and death from poisoning result.

The committee of the British Medical Association recommends the use of pituitrin to counteract the paralysing effect of chloroform upon the uterine contractions. In my own experience this drug is dangerous in any case where there is delay in the second and third stages of labour. Its uses are mainly for hæmorrhage after delivery of the placenta, and as

a means of sensitizing the uterus in order to bring on labour.

Ether.—Ether is preferred to chloroform by many practitioners as it is said to be safer; this applies more to general surgery and deep anæsthesia than to midwifery practice. Extensive use is made of it in England, and especially in cases where chloroform is contraindicated; it can be given by the patient herself in small doses. Ether is pleasant to take, and often acts as a stimulant to the heart; it does not, as a rule, diminish uterine contractions, and is useful in cases of operative intervention, such as forceps, Cæsarean section, and for the repair of lacerations. It has no bad effects upon the fetus if its administration is not too prolonged or deep. The disadavantages are that it is sometimes slow in action, and needs a special apparatus and a skilled administrator. The chief drawback is its irritating effect upon the respiratory passages; it is therefore unsuitable if pulmonary complications are present or there is œdema of the lungs, as in nephritis. Some of the risk can be reduced by giving ether in a warmed apparatus, but it causes more sickness than chloroform. Ether is inflammable, and care must be taken in domestic practice or in operating rooms where electric appliances, such as the cautery, are in use. Sometimes a mixture of alcohol, chloroform, and ether is given, but not so frequently as in surgical work.

Gwathmey, of New York, has advocated the instillation of an emulsion of ether into the rectum during labour in combination with the intramuscular injection of morphine in a solution of magnesium sulphate. This method has gained a number of supporters, and in some cases gives excellent results, which improve as the technique becomes more perfected; it is inexpensive, and is easily carried out in a private house. The instillation takes time, and undue excitement on the part of the patient may follow it. There is danger of irritation, and even of sloughing of the rectum, if the ether emulsion is not properly prepared. The amount of absorption of ether must vary to some extent, and cannot be regulated in the same was as by the inhalation method.

Nitrous oxide.—The administration of nitrous oxide gas and oxygen is undoubtedly the most ideal method of obtaining anæsthesia in midwifery practice; it is safe, relieves pain, and does not interfere with the progress of labour. It may be employed during uterine contractions, and continuously towards and during delivery. It has no harmful effects upon the fetus. After birth, before the cord is severed, oxygen alone may be given in a case of asphyxia. The after-effects of gas and oxygen are negligible. This method is especially useful in short operations, such as induction, version, forceps delivery, and repairs. It is safe in toxic, cardiac, and pulmonary complications. It is recommended to begin with gas and oxygen, and to decrease the gas as each labour pain nears completion. The disadvantages are that the apparatus is expensive and cumbersome for private practice; a skilled anæsthetist is necessary. Sometimes the patient becomes excited and difficult to anæsthetize. If there is headache after the recovery of consciousness the mixture has contained too much nitrous oxide.

Ethylene. — A mixture of equal parts of ethylene and oxygen has been advocated lately by some American obstetricians (de Lee, Blevis). There is said to be no excitement, the induction period is short, and it is safe in cardiac cases. There is no irritating effect upon the lungs or kidneys. The mixture is useful in light intermittent anæsthesia, and can be supplemented by ether for delivery. It has no ill effects upon the fetus unless prolonged. Its chief fault is that it is highly explosive.

Local anæsthesia. — Local anæsthesia is advocated by some obstetricians, more especially for the relaxation of the tissues of the pelvic outlet. Rose, who employs novocain in both stages of labour, gives intradermal infiltrations of the abdominal wall in order to abolish the pain of the skin reflexes; in the second stage he injects it slowly into the perineal structures. He considers that lacerations are usually prevented, and that, if they occur, their repair is easily effected.

De Lee employs procaine combined with adrenaline as a local injection in Cæsarean section operations. Browne uses local anæsthesia entirely for the immediate repair of the perineum, injecting 4 to 6 drachms of a 2 per cent solution of novocain with 1 minim of 1 in 1,000 adrenaline solution to each drachm of novocain. The infiltration of the perineum and vagina is obtained by a hypodermic needle. Perfect re-

laxation and anæsthesia result without the discomforts which follow inhalation methods.

Spinal anæsthesia.—Spinal anæsthesia is employed in surgical practice, and also in midwifery to some limited extent; it does not lessen uterine contractions or interfere with retraction, and therefore does not cause post-partum hæmorrhage. It relieves pain by paralysing the pelvic area. There are no toxic effects upon the liver or kidneys, and it does not seem to harm the fetus. Burns especially advocates its use in Cæsarean section, in cardiac cases. It has been found to give good results in cases of forceps, version, and breech deliveries. It requires a skilled administrator, especially in obstetrics, and in some cases its effects are very variable. Until it has been more widely employed it is difficult to give an opinion on its merits in midwifery practice, but there is no doubt that it has a place in cases where inhalation methods are contraindicated. It is not always sufficiently prolonged in its effects in the case of a primigravida. Headache is a symptom, but this can be prevented to some extent by using a very fine short needle for injection. The drugs most frequently employed are stovaine or novocain; cocaine is considered dangerous by most obstetricians. Much of the success of the method depends upon technique and the injection of the drug low down in the cord, so as not to interfere with the uterine contractions.

CONCLUSIONS

Each maternity case must be given individual attention with regard to the most suitable sedative and anæsthetic to be employed. The age, parity, temperament, general health, and complications, if present, must all be carefully considered. Obstetrical anæsthesia is not quite comparable with the surgical form. The pain is prolonged, and has to be combated with sedatives as well as with anæsthetics; the effect of these sedatives must be taken into consideration when an anæsthetic is decided upon.

Light anæsthesia is of little use in surgery, while it is generally employed in midwifery practice, except in cases where operative intervention is required. The action of the uterus must be maintained, and hæmorrhage after delivery must be prevented as far as possible. The expenditure of time, with its consequent financial complications, is a consideration. It is desirable that private patients should have the continuous attendance of the practitioner during labour, if sedatives or anæsthetics are to be given, just as in hospital practice; yet it is impossible to demand this unless adequate financial compensation is made by the patients for the loss of practice elsewhere.

In surgical practice only one life is involved. In midwifery the interests of the child are of great importance in uncomplicated cases where the only consideration for treatment is the relief of pain to the mother. Perhaps the safest sedative is chloral and potassium bromide, and the safest anæsthetic is gas and oxygen, from the point of view of the fetus.

It is a common mistake to carry out violent methods of artificial respiration if the infant does not breathe immediately after birth. We have to remember that it is narcotized to some extent, and requires time to recover; warmth, rest, and clearance of its respiratory passages are sufficient in most cases of delayed respiration, but CO_2 and oxygen should be given if there is any undue delay. Many an infant loses its life from misguided methods of restoring animation, such as bathing and artificial respiration.

In England, where there is so much discussion at present as to the advisability of every woman in labour having relief from suffering, the question is, What is to be done about the patients under the care of midwives? These number about 60 per cent of all the cases of the country. Are these patients to be excluded from all methods of relief from painful labour? Are they to be attended by an anæsthetist, and, if so, who is to bear the expense? If midwives are to be permitted to give sedatives, or even anæsthetics, it will involve general training in surgery and medicine and special training in sedative administration. This is a real problem, and the opinion of the medical profession is divided.

There is room for much reform in the management of labour by medical practitioners, and perhaps that is the first step to be taken. The agony suffered by parturient women is one which has called for relief throughout the ages; it should appeal to every humane individual in the medical profession.

DISCUSSION

DR. HENDERSON (Ignace, Ontario) said that since he began practice he had used chloral throughout labour and had found it very valuable. He did not think that the administration of chloroform was dangerous. He had only had three maternal deaths in over 2,000 cases, and none of them was due to chloroform.

DR. M. MACKELLAR (Gwalior) said she had practised in India for 37 years, and had always used chloral and chloroform without a death in delivery.

THE TREATMENT OF PARA-NASAL SUPPURATION PERSISTING AFTER OPERATION*

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ALL is not well with the position of the surgery of the nasal accessory air cells, or this subject would not occupy the important position given it on this program. Ralph Fenton, in a very instructive paper on "Non-Infective Factors in the Etiology of Sinus Diseases," says, "Dissatisfaction with surgical operations for the relief of sinus disease has become a commonplace among patients." "Once a sinus, always a sinus" has become a familiar text among the laity.

I am not alone in my view that there has been a great deal of unnecessary and unwise surgical zeal devoted to the nasal accessory sinuses. Eugene Lewis says, 'No great amount of clinical experience is required to realize that for some reason or other patients who have been subjected to extensive surgery of the upper respiratory tract are seldom better of their original ills." I commend his courage in demanding less spectacular surgery and more serious consideration of the underlying principles concerned with inflammatory manifestation of mucous membrane. My contribution is merely an effort to discuss the subject from my own experience. I hope to learn much; probably I shall have to give up some pet ideas or even take up again discarded ones, which you have found wise through better and more mature experience.

Persistence of discharge from any nasal accessory sinus after operation does not necessarily demand further surgical measures of a more radical nature. The main symptoms for which the patient consulted us, such as pain or discomfort in the head, nasal or post-nasal discharge, nasal obstruction, recurring "head-colds," or mental depression or lessening of the power of concentration, may have been so greatly benefited that even if some nasal or sinus secretion persists it may not be of sufficient importance to require further instrumental interference.

The extraordinary efforts made to detect the slightest amount of mucoid secretion in an accessory air-cell and the ridiculous importance allotted to its presence are further evidences of the extent to which the subject of foci of infection has clouded our clinical vision and made us forget our elementary physiology.

I do not wish to belittle in the slightest the importance of what might be called refinements of diagnostic measures. The use of the naso-endoscope and exploratory suction measures, as has been so long and persistently advocated by Dr. P. Watson Williams, are of great assistance in obscure cases.

Nasal discharge or post-nasal dropping has taken hold of the average individual on this continent to an extent quite different from that in older countries. So eager are our people here to be free from all noticeable nasal secretion that on the slightest appearance of any nasal discharge they run off to a specialist for a "nose treatment". No wonder then there have grown up "spraying rhinologists".

The type of patient is of importance in determining the treatment best in an individual instance. The neurotic patient, very uneasy if he has any nasal secretion he can dislodge, afraid that by swallowing some of it he is liable to all sorts of diseases, may simply require to have his fears minimized, be encouraged not to worry, and assured that there is nothing amiss likely to cause him any future trouble. He may

*A paper opening a discussion at the combined meeting of the British and Canadian Medical Associations, Section of Otology and Laryngology, Winnipeg, August 29th, 1930.

well be told that occasional increase of his nasal secretion is to be expected when the weather is damp or when he takes what we call "a cold". Regulation of such a patient's manner of living, habits, diet and exercise is of more importance than local medication to his nasal or sinus mucosa.

Persistence of discharge alone from any sinus that has undergone operative treatment is, as a rule, unsatisfactory to the patient and discomforting to the surgeon. Taking each cavity by itself I shall endeavour to enumerate some of the reasons for failure in operative treatment to secure complete relief from undue secretion.

FRONTAL SINUS

Acute frontal sinus inflammation usually gets well of itself, or may require some minor operation, such as removal of the anterior end of the middle turbinate to facilitate drainage. If the discharge persists after this simple operation it may be helpful to probe or wash out the sinus. The fronto-nasal duct is a very irregular channel, surrounded by ethmoidal cells, and in only a very small percentage of cases can it be probed or irrigated without undue traumatism, especially in recent cases of fronto-ethmoidal disease. Following Mosher's method of first breaking into the agger nasi cell, I have been able to reach and irrigate many frontal sinuses in which I had previously failed by trying to find the opening of the frontal nasal duct under the middle turbinated bone. Lavage alone, then, may be sufficient to cause the disappearance of the suppurative process in the frontal mucosa. Complete cessation of the discharge may not take place. If only a slight amount of mucus comes into the middle meatus, increasing or becoming purulent on slight provocation, and little or no discomfort or systemic symptoms are associated with it, the patient may choose to continue the nasal lavage rather than submit to further operative procedures that in the end may not entirely rid him of his secretion. This applies to all the sinuses, and I think if we look upon the subject more from the patient's standpoint we will not be unduly alarmed by the continuation of some muco-purulent nasal discharge, or be concerned too much because we are able to see some secretion in the washing from the cavity. The finding of lymphocytes or polymorphonuclear cells, while probably indicating chronicity of the pathological process, should not by itself demand further operative measures. Proetz very aptly puts the question, as follows: "In such cases is it justifiable to resort to treatment which experience teaches us is useless, simply to do something? Perhaps in occasional instances, but on those occasions certainly, the something should be simple, above all harmless and not especially expensive." If the discharge persists and is not associated with any gross ethmoidal disease some additional measures will be necessary if a decision has been reached to endeavour to restore the frontal mucosa to its normal thin moist condition. The discharge continues because of the inability of the frontal mucosa to recover from its present œdematous condition, owing to ineffective drainage Œdema with some superficial exfoliation of epithelium and marked round-cell infiltration beneath the epithelial layer is the pathological process with which we have to deal Deficient drainage may be due to our failure to secure a sufficient nasal airway prior to operation, *viz.*, a highly deflected septum, a large middle turbinate, or hypertrophy of the anterior lip of the unciform grove.

In the absence of pain, œdema of the forehead, or evidence of bulging of the inferior wall, I believe the best treatment is to wait a little and see what the effect will be of a change in climate, a few dry sunny days frequently making a great difference in the clearing up a tardily resolving sinus infection. A few irrigations with a frontal cannula are of considerable assistance. Should the process not respond to such measures it is well to try and estimate how much thickening is present and also gain a knowledge of the size and depth of the frontal cavity. The use of lipiodol and x-ray is here very valuable indeed. The x-ray may also show very considerable ethmoidal disease situated below the frontal, mounting into or even extending over the orbit. In such cases, further ethmoidal removal may be very helpful. If our lipiodol examination shows a very greatly thickened mucosa after all manifestations of acute frontal inflammation have long since subsided, I doubt very much if any intranasal measures are likely to be followed by a cure of the mucosal infection. If, however, only a mucoid discharge is present, periodically becoming purulent with acute coryzal attacks, I do not believe any further surgical measures are necessary. Should pain, œdema of the forehead or bulging of the upper and inner angle of the orbit take place some external operation should be considered.

Before any external operation is attempted, a very thorough ethmoidal removal should be

done and a sufficient interval of time allowed to see what the result is. Any case of frontal sinus disease requiring external operation has so much ethmoidal disease present, that it is a *sine qua non* that every effort be made to secure a satisfactory ethmoidal condition before the external operation, or at any rate at the time of the external attack. The late Christian Holmes advocated a small opening into the floor of the frontal sinus in those very acute frontal attacks when intranasal drainage was not obtained. I have on two occasions found it necessary to open an acute frontal sinus through the upper and inner angle of the orbit.

The operation that has given the most satisfactory result from both the patient's standpoint and my own is that advocated by Mr. Howarth in the *Journal of Laryngology*, somehow known in the United States as the Lynch operation. If the frontal cavity is moderate in size and not separated into loculi unapproachable through the floor of the sinus a very satisfactory result will ensue in a large majority of cases. It is essential, however, that all the ethmoidal cells in the floor of the sinus and over the roof of the orbit be thrown into one main chamber. Furthermore, a very wide opening into the nose is to be obtained by free removal of the inner orbital wall and the ascending process of the superior maxilla. My greatest difficulty is to keep this opening from closing over, and some other plan than a large drainage tube or the application of silver nitrate seems to be necessary. Denker's method of making a flap to line the new fronto-nasal channel is a very intricate and difficult procedure. I have no experience of it. Professor Seiffert applies a Thiersch graft to a finger-stall packed with gauze and introduced from the anterior nares into the frontal sinus following an external operation on the frontal and ethmoidal cells. If the new channel closes over by a diaphragm of connective tissue, or narrows much by granulations, I have resorted to the use of the rasp, with or without bougie. In the majority of cases this will accomplish the desired result and the discharge will rapidly subside. When, however, owing to the large size of the frontal and the formation of many partial partitions, the discharge still persists, one is in a dilemma. He should seriously consider if it is wise to do any more surgery, for the only operation then is one associated with probably considerable scarring. The Killian operation I have given up; the bridge leaves a blind area and often necroses away itself. Sewell, of San Francisco, does not advocate intranasal surgery for the relief of chronic frontal sinus disease.

If a very radical operation is decided upon because of extensive necrosis of the front table, or an acute osteomyelitis is feared or present, a very thorough removal of all the frontal mucosa is essential, leaving no nooks or corners with polypoid material, and obliterating the cavity entirely by allowing the tissue of the forehead to fall into the depression, filling it completely. In large deep cavities involving both sides this is a formidable procedure and usually a cosmetic catastrophe for the patient. Great gentleness in removing the frontal mucosa is essential lest we nick the bone and initiate a spreading infective osteomyelitis. Even in cases in which there is an extensive fistula in the orbital wall or above the supraorbital margin, operative procedure, limited to the Howarth operation, may be quite sufficient, but if the fistula is associated with a former Killian operation with necrosis of the bridge, the resulting bone defect will mean a badly scarred forehead. The Howarth operation may be carried out under local anæsthesia, with ligation of the posterior ethmoidal arteries as advocated by Sewall, of San Francisco. Failure then to cure the suppuration may be due to: (1) insufficient removal of the diseased mucosa, (2) failure to remove all the ethmoidal prolongations about the floor of the frontal and roof of the orbit; (3) failure to secure sufficient permanent drainage into the nose; (4) lack of completion in the preliminary ethmoidal removal; (5) failure to recognize suppuration in a large crista galli cell or the opposite frontal sinus; (6) lack of care in making sure by the occasional use of a large bougie that the frontal nasal opening is not narrowing too much; (7) too much interference with the healing process in a well conducted operation, by excessive douching; (8) the failure of the operator to take time to stop all the bleeding and see every step he takes, so that every possible recess and cell is thoroughly opened into the main channel.

SPHENOIDAL SINUS

Persistence of discharge after operation on the sphenoidal air cell is due in the vast majority of cases to not making a sufficiently large opening in the anterior wall, or failure to keep it from closing or becoming so small that aeration and drainage are not sufficient. The preliminary operative work on the posterior part of the septum

and posterior portion of the ethmoidal wedge may not have been such that a free and unimpeded view of the front face of the sphenoid was obtained. A large enough window may have been made at the operation, but the opening is narrowed by the formation of a fibrous diaphragm. It is curious how nature will keep patent the opening we make and desire to close and seal up openings we try so hard to keep permanent. The use of strong silver and punch forceps permits us to again have a large opening but the tendency for it to again become small is always present. The discharge will persist with varying exacerbations, depending on how much infected œdematous tissue lines the sinus and the degree of drainage. The mucosa cannot be removed by instrumental means owing to the thinness of the walls separating it from very important structures. I deprecate any efforts made to remove the sphenoidal lining by instrumental means, even if local œdematous areas be seen, *i.e.*, a polypus. One runs considerable risk in snaring it off since he is unable to assure himself that no thin plate of bony wall will come away also and if this happens to be from the superior or external wall a disaster is threatened. It must not be forgotten that the vessels in the submucous layer communicate freely with those of the orbit at the optic foramen, and in the lateral wall are many minute foramina leading to the cavernous sinus. There is a venous connection also through the sella turcica.

Some sphenoidal sinuses are very irregular in shape and have sulci that pass outward and away into the lesser and greater wing of the sphenoid or forward towards the maxillary antrum. In these depressions, as in other sinuses, the mucosa is usually very thick, and even though the greater part of the sinus cavities available for inspection by anterior rhinoscopy be found quite healthy the discharge originating from these inaccessible areas continues. Occasionally the sphenoidal sinus has on its upper or external surfaces a large ethmoidal cell which not having been recognized may be responsible for the persistence of suppuration in the sinus because it drains into the sphenoid when the patient is lying down.

Irrigations are helpful in removing the secretion from the deeper recesses and the use of some of the various silver salts, such as argyrol or neosilvol, is decidedly beneficial. Bismuth and oil is sometimes of value in the more recent cases but has a tendency to cake and remain indefinitely. With very little clinical experience to support me, I feel that the use of ionization with zinc in these large irregular sinuses is likely to be a very useful and hopeful adjunct to treatment. With the patient lying on his back and the chin well turned up there is little difficulty in keeping the zinc solution in the cavity when, with a long pliable terminal, ionization may be carried out with little difficulty or inconvenience to the patient. The use of strong silver solution is liable to be followed by very sharp persistent neuralgia, and if there happens to be a dehiscence in the bony walls separating the sinus from the neighbouring nerves serious results may ensue.

When the opening persistently becomes too small, owing to the formation of granulations and ultimately a fibrous sheet, I think it best to allow all inflammatory changes to run their course and then when the membranous wall covering the opening has lost most of its blood supply and is merely a thin layer of fibrous tissue, we may renew our efforts to bite it away without the same liability to re-formation. Too early an attempt to destroy this fibrous wall defeats its own object.

The use of Higginson's syringe with a fairly large pipe is a useful instrument for a patient's use in douching forcibly the posterior region of the nasal cavity. An acute sphenoidal suppuration may exist as a separate disease and rapidly responds to simple drainage, but the discharge occurring in chronic cases is so often associated with disease of the posterior ethmoidal cells that the success of the treatment of the sphenoidal suppuration depends on our ability to cure the disease in the bordering air cells. It must always be remembered that the outer two-thirds of the front face of the sphenoid form a common wall with the last posterior ethmoidal cell. The opening into the sphenoidal sinus may therefore be made much larger by removal of this common wall even if the last posterior ethmoidal cell is healthy and has to be sacrificed. Occasionally the maxillary antrum has a partition dividing it into an anterior and posterior compartment. Suppuration in the posterior part may simulate disease of posterior ethmoidal cell or the sphenoidal sinus. The sphenoidal septum may deviate so much to one side that the same sphenoid can be entered from either nostril. I have had one such case.

MAXILLARY ANTRUM

A not uncommon cause of persistent discharge from an antrum that has been operated upon by any method is failure to recognize frontal and ethmoidal disease. The discharge from a suppurating frontal sinus may empty directly into the maxillary antrum, or, owing to a large ethmoidal bulla or a prominent anterior lip of the unciform grove, be easily directed into the antrum. Reduction of these obstructions, with removal of the anterior end of the middle turbinate, may be all that is necessary to secure a satisfactory result in the antrum.

The intranasal operations for drainage of the maxillary sinus on the whole have not given me satisfactory results, except in cases of comparatively recent duration, or what one might term long drawn out acute inflammation. It is difficult to secure a large enough opening, especially in those whose nasal wall bulges into the antrum. The bone may be sufficiently removed, but it does not follow that the thick mucous and fibrous wall is removed in so complete a manner. In many cases where I have opened the canine fossa in patients on whom I have performed intranasal drainage I have been greatly surprised at the small opening found leading into the inferior nasal meatus and its poor situation. There is no comparison between the thoroughness with which one can remove the nasal wall of the inferior nasal meatus in a canine fossa operation and one through the nose. In the former one can see every step one takes, while in the latter one can only hope for the best.

It is well in all cases, I feel sure, to remove the anterior third of the inferior turbinate. Measures directed to preserve this structure frequently prevent the patient washing out his own antrum and lessen the value of ventilation. It is curious how some operators persist in thinking they can thoroughly remove the polypoid œdematous tissue in the antrum by the use of various curved curettes passed into the intranasal opening. The use of periscopic magnifying lights introduced into the antrum may give a very exaggerated idea of the œdematous change present. Operations, such as that advocated by Canfield, in which the antrum is entered at the anterior nasal angle, give a better approach and permit a direct, though small, view. Instrumentation may then be carried out, but not in so thorough a manner as I believe it should be done.

Failure then in these antrum operations has taken place because the operation was not one suitable to the pathological condition causing the discharge, *i.e.*, the œdematous change does not respond to simple aeration and drainage. The canine fossa, or Caldwell-Luc, operation was designed to secure a better approach to the diseased tissue and to secure more accurate and complete intranasal communication. Removal of diseased tissue was then carried out by direct inspection with various shaped curettes. A marked advance in clearing up antral suppuration followed, but complete cessation of discharge did not by any means ensue. The persistence of the discharge, or its reappearance on slight provocation, is due, I feel quite sure, to the method of attacking the antral mucosa. Operations performed under general anæsthesia with the patient lying down simply mean scraping out the antrum very imperfectly in a sea of blood. Since I have had my patients in a half-sitting position and have peeled out the mucosa in these chronic œdematous cases, I have had very much better results. My intranasal openings are made very large, just as large as the inferior nasal meatus permits. I endeavour to separate the membrane from the antrum wall until it is attached only at the ostium area, where a slight twist brings the whole mass away, just as one takes a pudding bag out of a pot. In this manner one does not miss the thick pyogenic mucosa in the pre-lacrimal recess, anterior alveolar fossa or sphenoidal fossa. Furthermore, one is able to observe very accurately the condition of the floor of the antrum and see that carious areas are not permitted to remain associated with suspicious or crowned teeth. It is then also very easy to bite away some of the membranous wall of the middle meatus.

General anæsthesia is not necessary in all cases. Preliminary use of morphia and hyoscine, with cocaine pledgets in the outer wall of the nasal meatuses, gives very satisfactory anæsthesia. I have carried out bilateral operations many times on females in quite a satisfactory way. It is the method of election in cases of chronic pulmonary conditions. My main contention is that failure to cure the discharge is due to insufficient removal of the diseased mucosa. It is all very well to say one should remove only the diseased mucosa, but how can you say that the comparatively thin lining one sees today is not many times thicker if viewed at another time. I believe the antral mucosa under slight provocation swells up like a sponge. In my preliminary examination of these antral cases, I use

lipiodol and olive oil (1-3), and it is surprising how altered is the picture you get with the x-ray from that found even two weeks following the injection. It is, however, easy for the lipiodol to escape from the antrum during the journey to the x-ray department or because of the dependent position in which the ostium is placed while the plate is being taken. When this occurs it is very easy to be misled as to the amount of thickened mucosa. A mixture of bismuth and liquid paraffin is retained much more readily in the antrum, gives quite as good a shadow, but is difficult to remove even by irrigation. Some beneficial effect is found when bismuth is used and even if some remains permanently in the antrum it is not a matter of much consequence. Hunt, of London, Ontario, advocates the removal of all the mucosa that can be stripped off by blunt dissection. This, I think, applies to those cases where the œdema and polypoid hypertrophy have not reached such a stage as to involve all the mucosa and is a commendable effort to be conservatively radical.

The opening in the nose should be flush with the floor of the antrum, and I think it probably better to lay down a flap so as to lessen the tendency to granulation on the antronasal crest. A complete peeling out of the mucosa may not be followed by cessation of discharge, because somehow a membranous curtain has re-formed another antronasal wall in the inferior meatus. I have seen this occur in cases where I have felt my intranasal opening was too large and I have been unnecessarily zealous. I cannot explain this, but I feel that inefficient removal of the anterior part of the turbinate is a factor as well as possibly my failure to use a flap on the antronasal ridge. Persistent and forcible douching of the antrum after operative procedures delays the healing and regenerative process that McGregor and Knowleton have shown takes place following complete evisceration of the antral mucosa A very foul odour, with copious purulent discharge, sometimes comes on several days after the operation. It does not last long and responds readily to monsol and saline irrigations. A piece of packing, a sponge, or a loose piece of bone or tooth is very easily left in and readily accounts for persistent discharge. If in the removal of the antral mucosa sharp instruments are used, damage to the bone may follow and areas of granulation tissue with bony necrosis may ensue and keep up the secretion.

The reparative process in the antral cavity following complete evacuation of the membrane may take a curious course. Discomfort, discharge, even odour, with or without crusts, may persist or recur at intervals. Difficulty may be experienced in inserting the curved cannula and when this state of affairs is found some months after the canine fossa operation, a reasonable inference seems to be that the antronasal wall has re-formed. But one may be very easily misled, as will be seen in the following report.

A gentleman, 32 years of age, operated upon seven months ago for chronic maxillary sinusitis. The membrane was moderately thickened, less than one would have expected from the pictures produced by lipiodol and x-ray. The entire membrane was peeled out and a very large opening made in the inferior meatus, without a flap. Convalescence was a little slow and associated with profuse purulent discharge of foul odour. This subsided readily under saline douching. For some months the patient's general symptoms were much improved, but he still had some nasal discharge, varying greatly in amount and occasionally associated with a foul odour. I decided to reopen this antrum which I did under a local anæsthetic, and found greatly to my surprise that the antrum had been divided into two compartments, anterior and posterior. The former was largely filled with a dense irregular red lining covered with normal mucosa. The thin partition separating it from the posterior cavity was removed showing a large cavity with a smooth normal-looking lining. The antronasal wall had not re-formed, but my cannula was inserted into or against a mass of dense granulation tissue which largely occupied the front part of the antrum.

This experience strengthens my advocacy of reopening antra where persistence of discharge is considered due to a local condition, such as the formation of webs of diaphragms resulting in recesses where retention of secretion easily takes place. Particularly do I think this procedure desirable where odour is associated with the secretion. Why these septa form I do not know, nor am I aware of any post-operative treatment likely to influence them, except possibly light packing of the antrum following the canine fossa operation. The gauze might be impregnated with an oily mixture of bismuth and left in for four or five days and not reinserted.

Assuming an antrum to have been thoroughly cleared of all pyogenic œdematous mucosa and an efficient opening made into the nose, it may be months before all noticeable secretion ceases. Many things may interfere with the reparative process, and this applies to all the other sinuses as well. The patient may have poor recuperative powers, owing to anæmia, tuberculosis, syphilis, chronic nephritis, or any debilitating disease. His manner of living, habits, diet, even the atmosphere in which he works, may have a bearing. The heavy, rapid, immoderate eater and drinker, with chronic intestinal sepsis and constipation, does not clear up well after sinus

operations. Lack of exercise and confinement indoors has a definite influence, while in this country the excessive heat and dryness of our living apartments conduces to permanent nasal and sinus congestion. Extremes of temperature and humidity add very materially to the readiness with which œdema of mucosa appears. Cold and dampness of the feet have a tendency to alter very promptly the turgescence of the nasal mucous membrane as was first shown by Muecke.

As many of our patients with œdematous manifestations of their sinus mucosa have as an underlying factor an allergic state, failure to overcome the hypersensitiveness leads to a persistence of secretion even though a new mucosal lining forms and is well aerated, because this new tissue still reacts to the same irritant. A family history of allergic manifestations, the presence of positive skin tests, and excessive eosinophiles in the nasal secretion and the blood suggest a consideration of allergy as the underlying cause of the œdematous mucosa. Such mucosal reactions do not necessarily come under the classification of infective processes, but the soil is such that acute or chronic infection readily occurs and persists with purulent discharge added to the mucoid material already present. Hansel goes so far as to say that "many of the chronic empyemas undoubtedly follow in the wake of an allergic process in which an œdema of the mucosa has occurred. In the non-suppurative hyperplastic or catarrhal group of paranasal sinus disease, clinical and histopathological studies have proved that in the great majority of cases the process is primarily an allergic disease. Therefore, all hyperplastic, non-suppurative sinus diseases should be considered as of allergic origin until proven otherwise."

THE ETHMOIDAL LABYRINTH

Happy is the surgeon who thinks he has solved the ethmoidal problem, but happier still is he whose patients agree with him. I approach the subject of persistence of suppuration after operations on the ethmoid with much misgiving. Owing to the unusual situation, being within the nose yet partially surrounded by the remaining accessory nasal air cells, and without any uniform anatomical formation, inflammatory processes associated with discharge present diagnostic and therapeutic problems that give the surgeon much cause for worry and oftentimes lead him into difficulties in which his surgical judgment is put to the severest of tests. Tilley says, "Of the ethmoidal region, it may truly be said that its mazes are intricate and often far reaching, so that when inflammation enters them, its accurate localization will often tax the diagnostic acumen of the most experienced rhinologist, and a knowledge of the risks involved in its radical treatment should steady the hand of the boldest operator. He who attacks inflammatory diseases of the ethmoid without an accurate knowledge of its anatomy and pathology, must surely hold lightly the safety and sanctity of human life." The persistence of discharge following operations on the ethmoidal cells is probably the commonest symptom present. I will only deal with the question in a general way.

It is not suitable to discuss the situation from the standpoint of the hyperplastic or suppurative type of ethmoiditis, because when the ethmoid has been operated upon this division does not obtain, since the process rapidly assumes more or less of a suppurative nature. The exception to this would be when the middle turbinate has been removed partially or completely as a preliminary measure, to determine how much benefit is to be obtained by improved aeration and drainage. Assistance in controlling the inflammatory process within the labyrinth capsule may be obtained by the use of argyrol packs. Skillern speaks highly of the use of this drug combined with glycerine and applied quite hot. I myself have never felt satisfied that this method is of any real value. I cannot see how sufficient penetration can take place through the bone to have any effect on the œdematous mucosa.

Suppuration after operations of the ethmoid is, in most cases, due to not having provided free spontaneous and permanent drainage to those cells whose inflamed œdematous mucosal lining is responsible for the secretion of the discharge. Mosher has made the way into the ethmoid easy, but it remains for someone else to show how to complete the work easily when one has arrived inside. It may, however, have been quite sufficient to open the ethmoid from the agger to the front face of the sphenoid and breaking through the floor to secure free ventilation and drainage, the middle turbinate being left to the last as it is an excellent landmark to keep us from the cuneiform area. The middle turbinate overhang may then be removed. Pratt, however, prefers to leave this in place. The ease with which infection can reach the meninges along the nerve sheath, as shown by Logan Turner, is

probably the most outstanding contribution to the pathology of nasal sinus infection in our time. Removal of the whole middle turbinate and all the ethmoidal cells one can reach in one sweep, after the manner of Ballinger and Sluder, is an extraordinarily bold procedure and one not without serious risk to the patient. I do not use this method. It is anatomically impossible to remove all the ethmoidal cells by the intranasal route. In my own practice, when I have decided to remove all the ethmoidal cells I am able to reach safely through the nose, I prefer to proceed in stages and allow sufficient time to elapse between such operations, so that most of the inflammatory œdema has had time to subside. I can then orient myself much better and follow the discharge more directly to its source. Nothing must induce one to be in a hurry, and if in doubt as to the safety of your manipulations or if you fail to see what you are doing all the time, it is better to stop at once and on some future occasion, maybe a month or more later, complete the procedure. When I have cleared out the ethmoidal areas as thoroughly as I can, I allow the patient to douche out his nose for a month or more before doing anything further. He may then be so much relieved that further treatment is not desired, but if there is still suppuration I try to determine if I have overlooked any hidden cells and also estimate as accurately as I can how much of the ethmoidal disease is dependent on the disease of other nasal air cells.

Suppuration high up in the nose, following a thorough cleaning out of the ethmoid intranasally, is probably due to diseased ethmoid cells running out over the orbit and unapproachable by any intranasal measures. The frontal mucosa may or may not be involved, but, if so, it is not likely to be restored to normal unless the infected ethmoidal cells above its floor are removed. If the nasal discharge is associated with the formation of multiple nasal polypi, recurring high up in the nose after removal, and the x-ray shows orbital prolongation of the ethmoid, the question of an external approach to this area is to be considered.

If any further operative treatment is considered desirable, I am strongly of the opinion that this should be carried out by external measures, for in this way one can determine the condition of the frontal mucosa, and can remove under direct vision all the higher ethmoidal prolongations with little risk to the patient. It is not, however, free from danger, for I have had one fatality, when a very slight leaking of cerebrospinal fluid was followed even ten days later by meningitis. When the ethmoid has been operated upon, probably a number of times, and a mass of polypoid and scar tissue is left through which purulent material trickles, and all recognizable landmarks have been removed, the surgeon is faced with very considerable responsibility. He must assure himself as to the condition of the other nasal air cells and their probable influence on the present ethmoidal condition. If the sinuses have been to a large degree eliminated and another attempt to clear up the ethmoid area is to be carried out, certain preliminary proceedings are desirable. The more room gained in the approach to the upper and posterior regions of the nasal meatuses, the greater the chance of success, for one sees and knows better what is being done. Even a moderately deflected septum may be resected with advantage, and Skillern points out the benefit obtained by removal of the uncinate process from its insertion to its end. By this measure a gain of one-quarter to three-eighths of an inch in width is obtained—quite enough to make the difference between success and failure. When one has removed so much of intranasal mucous membrane as follows extensive ethmoidal operations, it is surprising how little crusting follows.

When a patient has passed victoriously through an ethmoidal campaign, probably lasting for months or even years, and looks back at a preoperative time of nasal obstruction, recurring "head-cold", persistent nasal discharge and head-discomforts of all sorts, it would be surprising if he had not become hypersensitive to variations of temperature and humidity, magnifying little discomforts and apprehensive of the return of his dreaded "catarrh". That he becomes a nasal neurasthenic is not to be wondered at, that he will always want to tinker with his nose, or have somebody else do it for him, is probably a not unusual ending for many patients who have had active service in an ethmoidal campaign.

DISCUSSION

DR. A. LOGAN TURNER (Edinburgh), with the aid of a series of excellent lantern slides, insisted on the importance of the part played by the ethmoidal cell labyrinth in maintaining the nasal discharge. This was a factor which must not be overlooked in the consideration of the subject; by some it was regarded as the key position. He showed slides illustrating the development of the various groups of "border cells"; the more extensively these were developed the more difficult became the

problem of successful drainage of the ethmoid cells. There were many cases in which no intranasal operation, however radical, could reach every infected ethmoidal cell, and the question of the advisability of an external operation might be usefully discussed.

DR. M. F. ARBUCKLE (St. Louis, U.S.A.) said that allergy was a condition that had been mentioned with regard to post-operative nasal sinus suppuration; he thought it deserved more attention from the rhinologist. Many persons afflicted with headache, asthma, chronic bronchitis, hay fever, nasal obstruction, abnormal nasal discharge, and the like consulted the rhinologist or the internist, and in many cases they had had one or more nasal operations without relief. A very considerable percentage of such cases represented persons who were suffering from a so-called allergic reaction, and the most important step in their treatment was the discovery and removal of the offending substance or substances, which often brought about most unexpected and striking results.

PROFESSOR G. W. FLETCHER (Winnipeg) said that, although the borderline between chronic non-suppurative and chronic suppurative sinus disease was not strictly marked, and one often merged into the other, the main picture stood out clearly. Chronic non-suppurative inflammation was much commoner than was generally supposed, and was often described by the patient as a "chronic nasal catarrh". There was no purulent discharge present, except in periods of acute infection. Mr. Tilley had claimed that these cases were often overlooked by the physician, since transillumination revealed no opacity. A radiograph, however, showed an opacity caused by degenerate or thickened membrane. The symptoms in these cases were not marked. They consisted of excessive mucoid discharge from the affected cavity, and mild attacks of neuralgia in the first and second divisions of the fifth nerve. Diagnosis was made by x-ray examination and puncture, which might yield a mass of thick, glairy mucus. Pathologically this was essentially a low-grade inflammation resulting in œdema and thickening of the mucous membrane. The cellular elements were very scanty. The cilia might be present at certain parts and scanty in others, and polypoid changes might be present. Hyperplasia of the glands occurred, and the formation of cystic dilatations in the sinus. Chronic suppuration of the maxillary sinus was characterized by purulent nasal and post-nasal discharge from the affected cavity or cavities. Other symptoms that might be present consisted of supraorbital pain, headache at times, tendency to contract colds, nasal obstruction, cough, and chronic chest sequelæ. This was the ordinary form of antral disease, being much more common than the form previously described. The process was also much more active and the symptoms more pronounced. The pathology differed from that of the catarrhal form, inasmuch as infiltration with cells was much more marked. The membrane was, as a rule, much thickened. This might be uniform or patchy in distribution. Patches of granulation occurred sometimes, and areas of completely desquamated epithelium. Polypi might be found springing from any part of the walls. Caries and necrosis of the bone did not occur except in cases of syphilis and tuberculosis. In long-standing cases fibrosis developed, especially in the deeper layers. The excellent work done by Knowlton and McGregor was worthy of note. The antral linings in dogs were removed completely; in three cases it was found that regeneration of the mucous membrane commenced in the period of one to two weeks, at the end of three months it was largely completed, and at the end of six months it was practically impossible to tell the difference from normal antral lining, the cilia had been so completely restored.

MR. F. F. MUECKE (London) said that the more he operated on the nose the more conservative he became. He thought that the turbinates should not be removed; he looked on them as among the most important tissues in the body. Simply on stopping irrigation a nasal discharge frequently cleared up. He had abandoned the intranasal method of operating on the antrum, since one could not see round the corner, and he preferred to leave the sphenoidal sinus untouched. He believed strongly in correcting any gross septal deviation to aid nasal drainage.

DR. MCGREGOR (Toronto) described experimental work on the nasal sinuses. He had also been interested in the eosinophils for some time with respect to asthmatic conditions. Such patients varied surprisingly from time to time, and the eosinophils disappeared almost completely in the presence of almost any infection.

SIR STCLAIR THOMSON (President) said that the slides shown by Dr. Logan Turner indicated why nasal suppuration was sometimes inevitable in spite of any operation. They showed, too, that one should be tender of the reputation of one's colleagues who had operated on such cases. In opposition to Mr. Muecke, he considered the sphenoidal sinus the most satisfactory one for operative treatment. The ethmoidal labyrinth might be termed the *bête noire* of the rhinologist. Vaccines, in his hands, had proved absolutely useless.

LOYALTY TO THE IDEAL.—The Physician's Ideal has been slowly and painfully gained in the teeth of many hostile forces; and if it is to be maintained and transmitted, it will only be by strenuous and high-minded effort. To-day, if I mistake not, it is threatened by some of the characteristic developments of our time. Specialization in medical study and practice may be indispensable, but it endangers none the less that largeness of interest and culture which has marked the greater physicians of the past. Contemporary politics cast their own shadows on the progress of medical science. Socialism is not friendly to the highest individual achievement. The democratic tendency to bring physicians into the category of State officials, and to organize their professional activities on conventional Civil Service lines, is not wholly favourable to the highest view of their work, and may lower that personal relation with their patients which has often been highly beneficial to both. "The years teach much which the days never knew," says a wise proverb, and we must not be hasty to condemn the untried. It is always easy to be unfair to the distinctive features of one's own time, very easy in the case of a man whose own experiences of society belong to the past. At least I am on safe ground when I insist—and this is the moral of my present address—that, whether as a State servant or as a private practitioner, the physician's efficiency will continue to be conditioned by his resolute loyalty to the Physician's Ideal.—Right Rev. Hensley Henson, Lord Bishop of Durham.

FILTERABLE VIRUSES AND PRACTICAL MEDICINE*

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I APPRECIATE the invitation to open this discussion, not as a personal honour, but rather as a compliment to the laboratory worker, and an instance of that spirit of coöperation between the two branches of medicine—clinical and scientific — which is daily becoming more intimate and consequently more fruitful. There is one point that I should like to bring into prominence. The clinician, faced as he is daily with the vital problems of disease, should be, and often is, one of the great initiative forces in research. Since my appointment to a research post at the London Hospital I have come to realize how stimulating a close contact with the clinical side of medicine can be to the laboratory worker. But for this to be effective the clinician must have some conception of the lines along which the pathologist is thinking, and I feel, rightly or wrongly, that many clinicians may be out of sympathy with investigation in the field of filterable viruses as suggesting too much of what is termed academic research. I therefore welcome the opportunity of describing some aspects of recent work on this group of disease agents, and hope to show that, if something of practical value has already been achieved, the future promises that the laboratory may become of even greater assistance in this realm of disease. I propose, first of all, to discuss very briefly the probable nature of these so-called filterable viruses, and then to deal with the question of immunity in diseases of this class, for it is in connection with this latter question that much of practical import is going on.

THE NATURE OF FILTERABLE VIRUSES

Much of the work and speculation which this intriguing problem has incited has merely heightened that atmosphere of mystery with which the unknown is invariably surrounded. This, I think, goes a long way to explain the difficulty which the clinician has experienced in approaching the subject. Some have endeavoured to show that these viruses are unorganized enzyme-like agents, a *contagium vivum fluidum* as Beijerinck first suggested. Others, while admitting their particulate nature, consider that they represent a form of life differing from that of the cultivable bacteria. Some would even have us believe that they are the product of diseased cells, a product which when brought into contact with fresh susceptible cells gives rise to the same diseased state, and in so doing engenders more of itself, the virus thus becoming both the cause and the result of the disease. I do not deride speculation, for I recognize that it denotes a healthy and useful attitude of mind, but it is perhaps unfortunate that much of the speculation which this problem has called forth has served largely to cloud the issue. Surely it would have been better to start from the simpler and more obvious conception that these viruses are akin to bacteria than to evolve an ingenious hypothesis postulating a new form of life and endeavour to make observed facts support it. If one accepts a view of kinship as a working hypothesis the first question is: Are these viruses living? Now this is not such a simple matter to settle as one might imagine. The line of demarcation between the living and non-living is by no means clearly drawn; in fact, there is no single criterion of life. But there are certain characters (such as the power to multiply, to adapt to altered environment, and to assimilate from the surrounding medium without loss of individuality) which when present together are characteristic of living things; since filterable viruses possess all these, one is justified in assuming that they are alive.

Having admitted the living nature of these agents, a second question demands solution; this concerns their relation to the bacteria with which we are familiar. One factor, more than

* A paper read in opening a discussion in the Section of Medicine at the combined meeting of the British and Canadian Medical Associations, Winnipeg, 1930.

any other, has tended to obscure this issue—namely, the limitations of the microscope. Using the visible portion of the spectrum, particles below a certain size cannot be seen with the microscope; although, of course, this is a purely artificial limit it has had a profound effect on the way in which the problem of the nature of filterable viruses has been envisaged. We have become so used to staining bacteria and examining them by means of the microscope that we question the bacterial nature of a virus which does not lend itself to demonstration by the usual methods. This has led to these viruses being termed ultra-microscopic; but though some of them probably do merit that designation, there are others which are almost certainly within the limits of visibility with the microscope. The bodies described by Paschen in vaccinia virus, which many now hold with Paschen to be the virus, can be stained and seen under the microscope, and the virus of psittacosis is definitely associated with most characteristic bodies which I believe to be the virus. Another example is the virus of fowl-pox, so that there seems good reason for stating that "ultra-microscopic" is not a character common to this group of viruses. Undoubtedly they are extremely small, as is evidenced by the fact that the majority can traverse filters which hold back the ordinary bacteria, but is this a sufficient reason for marking them off as something different? I do not think so. Some of the so-called filterable viruses filter with great difficulty—vaccinia for example—and on the other hand there are visible and cultivable bacteria, such as *Bacterium pneumosintes*, and a number of small saprophytes in the human nasopharynx, studied by Olitsky and Gates[1] and by Dochez and his colleagues,[2] which pass through the more porous bacterial filters. On the score of size, then, there seems no good reason for separating these viruses from the bacteria; the one group merges imperceptibly into the other.

The inability to cultivate the so-called filterable viruses in a lifeless medium is another reason advanced for assuming that they are not bacterial in nature. For a time our only method of cultivation was in the tissues of the living animals, but the work of Steinhard and Lambert,[3] Parker and Nye,[4] Carrel and Rivers,[5] and others, has shown that they could be made to multiply in the presence of living cells in tissue culture, and the Maitlands[6] have further simplified this method of cultivation. Even though we were still unable to grow these viruses apart from living cells, I should hesitate to advance this as a reason for their being unlike bacteria, for there are visible bacteria, such as the leprosy bacillus, the cultivation of which in artificial media, despite repeated attempts in the past, is only a recent achievement which awaits confirmation. Recent work by Muckenfuss and Rivers[7] with the virus of vaccinia would seem to suggest, however, that the virus does not multiply either inside or at the surface of the living cells. Using Maitland's medium, which consists of rabbit's serum diluted with Tyrode's solution added to fragments of fresh tissue, they have obtained survival and possible multiplication of vaccinia virus when the living tissue was separated from the virus by means of a collodion membrane. This would suggest that the function of the living cells is to supply some diffusible substance necessary to the growth of the virus; should this work be confirmed, it may ultimately lead us to a method of artificial cultivation which would remove this apparent difference between the filterable viruses and cultivable bacteria.

No doubt there are competent authorities who will disagree with me, but in my opinion the available evidence strongly supports the view that filterable viruses are bacterial in nature. With each step forward in our knowledge of these viruses, the line of demarcation between them and the bacteria becomes less and less obvious, and I look forward with some degree of confidence to the time when the filterable viruses and bacteria will be merged into one large group, inside which, of course, there will be slight differences—subgrouping—just as there is in the case of bacteria at the present time.

IMMUNITY IN VIRUS DISEASES

It has become usual to speak of the immunity in virus diseases as being solid and long-standing, lifelong even, in contradistinction to the immunity resulting from bacterial disease, which is so often fugitive; but like most generalizations this is only partially true. Undoubtedly recovery from many filterable virus diseases is accompanied by the development of an immunity of high degree and long duration. One knows, for instance, how seldom an individual contracts diseases like measles, mumps, or yellow fever

more than once. But there are diseases due to filterable viruses such as foot-and-mouth disease, herpes, and the common cold—the recent work of Dochez and his colleagues would seem to warrant the inclusion of the last disease in this category[8]—in which the immunity is fleeting and of low grade, just as there are bacterial diseases such as typhoid fever which confer a good immunity. Here again the division between the two groups is not absolute.

Immunity to a bacterium is associated with the development of antibodies, the presence of which in the blood can be demonstrated in a variety of ways. Although the importance of these antibodies in ensuring the immune state varies in the different bacterial diseases, there can be no doubt that either alone or in coöperation with the phagocytic cells of the body they play an important part in the defence mechanism of the organism. This is not their only importance, for, of course, they are of the greatest service to us in diagnosis. It has been recognized for some time that immunity to filterable virus diseases is associated with the development of specific antibodies which, from the method employed for their demonstration, have been spoken of as neutralizing antibodies. During the last few years there has been a tendency to minimize the importanee of these antibodies in the vast majority of filterable virus diseases, and to speak of the immunity as being almost entirely cellular —a tissue immunity. Recent work, however, has gone a long way to controvert this view, and there seems little doubt that in filterable virus diseases, just as in those of bacterial origin, the two factors—cells and humours—work together in defending the tissues from invasion. An active immunity can be obtained against a filterable virus by methods similar to those employed in the case of a bacterium; a virucidal serum can be utilized to procure a passive protection, and with this serum the same immunity reactions that we are familiar with in bacterial diseases can be demonstrated. Let us consider these phenomena more closely.

ACTIVE IMMUNIZATION

There are two diseases due to filterable viruses against which prophylactic vaccination has been practised for a considerable time. I refer to small-pox and rabies. In the case of the former disease we make use of the fact that the virus of small-pox when adapted to the cow loses its invasive power for the human organism, so that when implanted in the skin it gives rise to a local lesion only, the evolution of which, however, confers immunity against the virus of small-pox. The principle involved—namely, the use of living virus which has been altered by passage through another animal species—is of limited application, for, apart from small-pox, fowl-pox is the only other example of a virus disease in which it is applicable.

Although this method of prophylactic immunization is good in that it produces a high degree of immunity, it is not without its dangers. Vaccination in Europe has been complicated of late years by an encephalomyelitis with a high mortality. It is true that the incidence of this complication is very low, about 1 in 40,000 vaccinated, or 1 in 4,000 of primary vaccinations at a susceptible age. But few though these cases are they cannot be ignored, and we must consider what steps are to be taken to avoid their occurrence.

The etiology of the condition is still under dispute, some holding that the disease of the central nervous system is the work of the virus of vaccinia, while others maintain that it is due to a dormant neurotropic virus which is stirred up by the vaccinia virus. Whichever view may be correct it would seem obvious that the occurrence of such a complication would be minimized or entirely avoided by reducing the amount of virus inserted locally in vaccinating, for the more virus implanted in the skin the greater the amount of virus which will invade the body generally. In England this view has led the Ministry of Health to issue an order that vaccination is to be made with one insertion only, with minimal trauma, and at the London Hospital we have employed dilution of the lymph. Gins also advocates dilution of the lymph, and it is possible that in Canada the immunity from these troubles has been due in part to the fact that vaccination is less drastic than in Great Britain. By still greater attention to the question of dosage the method might possibly be made quite safe, but, personally, I should like to see a method evolved in which inactive or dead virus was used. There are considerable difficulties to overcome, however, before such a method will be available.

Active immunization against rabies involves

another principle—namely, the use of attenuated or inactive virus. The classical method makes use of drying to attenuate the virus, but carbolized virus is used with equally good results. For long this principle was not considered as applicable to other virus diseases, and the view that the production of lesions with living virus was an essential factor in the development of the immune state was almost universally accepted. The observation, made independently by Vallée and his colleagues[9] at Alfort, and by the British Foot-and-Mouth Committee,[10] that the virus of foot-and-mouth disease could be rendered inactive by low concentrations of formalin and yet retain its antigenic power has put another aspect on the matter. I am not claiming that the immunity produced by inactive virus is as solid as that called forth by living virus; I do not believe that it is. But the method has its uses, and it has since been shown that vaccines can be prepared by this method from other viruses, such as fowl plague, distemper, and yellow fever. The work of Laidlaw and Dunkin,[11] in the prophylaxis of distemper, has been particularly successful. They make use of two vaccines: the first an inactive formolized vaccine which produces a certain degree of immunity, which is then converted into a solid immunity by the second vaccine consisting of living virus. The method has already passed beyond the sphere of experiment, and has been applied in the field with manifest success.

In other diseases progress along these lines has not been so rapid. Although in France a formolized foot-and-mouth vaccine has been used in the field to a limited extent, in England it is still in the experimental stage. In the case of this disease, however, it must be remembered that the spontaneous disease gives only a fugitive immunity, and a further complication is the existence of three immunologically distinct types of virus. If an attack of a disease does not confer a durable immunity one cannot hope to achieve very much by the administration of vaccines as a prophylactic measure, and this fact must be borne in mind when considering such diseases as the common cold and influenza, where one attack appears to confer little or no resistance to subsequent ones. There is another observation made by Laidlaw and Dunkin in connection with their work on distemper which puts a check on undue optimism. The supply of a filterable virus in any great quantity, at any rate at the present time, is obtained from the tissues of an infected animal. In the preparation of distemper vaccine, for instance, use is made of the tissues of an infected dog. Both the dog and the ferret are susceptible to this disease, but though a formolized ferret vaccine works admirably in the ferret it is a poor vaccine for the dog, and vice versa; the animal tissues present in the vaccine, when foreign to the vaccinated animal, interfere with the development of immunity to the virus. It is easy to see how this will mitigate against the successful application of the method in man, at any rate for the present. I make that qualification because much will depend on the progress which we can make in the cultivation of the filterable viruses. The work of Muckenfuss and Rivers, which I have already mentioned, gives some hope that this apparently insuperable difficulty will eventually be overcome. We had hoped at the London Hospital to evolve a method of vaccination against small-pox on lines similar to those employed in distemper. My colleague Dr. Bland has carried out a number of experiments with this object in view, but his efforts so far have not met with success. Formolized vaccine virus, inactive to the extent that serial passage in animals will not reactivate it, has only produced a very low-grade immunity, insufficient to protect even against a comparatively small dose of active virus. This has been a disappointment, but it should stimulate us to renewed effort. Research has given us a method of prophylactic vaccination against the filterable viruses which has proved its value in veterinary medicine, and I am optimistic enough to hope that further work will overcome the difficulties in the way of its exploitation in protecting man against some of the filterable viruses to which he is susceptible.

PASSIVE IMMUNITY

I mentioned previously that immunity to a filterable virus was associated with the presence of a specific antibody in the blood. The serum of a person, for instance, who has had yellow fever, when mixed with yellow fever virus in suitable relative proportions, will render that virus innocuous for a susceptible animal; it has neutralized it, hence the term neutralizing antibody. But the presence of the antibody can be

demonstrated in another way, of which I propose to give you an experimental example.

The guinea-pig is susceptible to the virus of herpes. Implanted in the shaved hairy skin, this virus gives rise to the typical vesicular lesion which characterizes human herpes. If one infects a series of guinea-pigs and essays reinfection in them at daily intervals it will be found that seven days or so after infection they can no longer be reinfected; they are immune, and it can further be shown that the onset of this immunity coincides with the appearance of a specific herpetic antibody in the blood. Such an immune guinea-pig can be hyperimmunized by giving it a series of inoculations of living virus, and thereby the neutralizing power of its serum for herpes virus can be considerably increased. Inject 2 c.cm. of such a hyperimmune serum into a normal guinea-pig, and twenty-four hours later test its susceptibility to herpes virus. It will be found to react very slightly, if at all, to a dose of virus which produces an intense reaction in an untreated guinea-pig; the guinea-pig has been passively immunized to herpes virus.

This method has its application in human disease, but since one cannot subject individuals to a process of hyperimmunization as was done in the case of the guinea-pig, use has to be made of convalescent serums. In Canada there is full appreciation of the value of the use of convalescent serum in poliomyelitis, but less, perhaps, of the prophylactic use of measles convalescent serum. Serum collected early in convalescence has a considerable antibody content, so much so that when adminstered up to the fifth day after exposure to infection in doses varying from 1 to 10 c.cm. according to the age of the person, it will give complete protection; and the same dosage given later, from the fifth to eighth day after exposure, though no longer protecting against measles, modifies the attack. In children under 2 years old, in whom measles is a redoubtable disease, one aims at giving complete protection; but in older children, unless they are delicate, it is better to give partial protection, for the modified measles is a trivial affair and the patient gets the benefit of acquiring a solid immunity to this disease.

Although this method has its uses in private practice it has its chief applications in children's hospitals and in the children's wards of our large general hospitals. In the Hospital for Sick Children, Great Ormond Street, this method has been applied for some time now, and has proved of the greatest service. It is also in use in the wards of the children's department at the London Hospital, and whereas prior to its introduction a case of measles appearing in the ward meant closing the ward to new cases and passing through a period of quarantine, now, the offending case having been dispatched to the fever hospital, the remaining children receive passive protection and the routine of the ward continues uninterrupted. The great drawback is, of course, the difficulty of procuring an adequate supply of convalescent serum. The recent success recorded by Fairbrother[12] in producing an effective antipoliomyelitis serum in a horse makes one hope that it may not be impossible to produce virucidal serums of effective titre in animals such as the horse, and so become independent of the limited and precarious supply of antiserum which convalescents now provide. But here again, as in the case of active immunization with vaccines, much will depend on the progress made with the problem of cultivation.

IMMUNITY REACTIONS

A valuable aid to diagnosis is given by such methods as the Widal and the complement fixation tests, and since virus infections give rise to specific antibodies one might expect that these same reactions would be of service in this group of diseases also. Experience is showing that this is the case.

Gordon[13] has shown that with the viruses of vaccinia and small-pox both specific flocculation and complement fixation reactions can be demonstrated, and recent work by Burgess, Craigie, and Tulloch[14] has demonstrated the practical value of the flocculation test. Small-pox in England is almost entirely of the mild type, the so-called alastrim, and frequently these cases present difficulty in diagnosis. The flocculation test is performed with a specific serum prepared in the rabbit and a suspension of the crusts from the lesions of the suspected case. The use of this test by Burgess, Craigie, and Tulloch during an outbreak of mild small-pox in the South of England and North-East England, has shown how very helpful it may be. These investigators examined material from fifty-three cases of small-pox, fifty-two of which were of the mild

variety, and in only three of these cases was there any difficulty in interpreting the result of the test. The findings with the flocculation test were checked by comparison with the clinical and epidemiological data, and by the result of vaccination during convalescence; complete agreement between the laboratory and field investigations was observed. Further, the crusts from twenty-seven cases of varicella, one case of septic rash, and one of impetigo were examined with entirely negative results.

When it is recalled also that in Great Britain the percentage of the population vaccinated against small-pox is steadily decreasing, it becomes evident that the control of this disease will depend to an increasing extent on the early recognition of cases, and the value of a diagnostic flocculation test as an aid to this cannot be over-estimated. The Bordet-Gengou reaction, or reaction of complement fixation, is also given by an antiviral serum in the presence of the specific virus. Mention has been made of the work of Gordon with vaccinia and small-pox viruses in this respect, and the researches of Netter and Urbain, Wollman, Marie, Ciuca, and others have shown that this reaction can be demonstrated in the case of other filterable viruses as well. At the London Hospital, Dr. Bland and I[15] have devoted a considerable time to the study of this question, and we have evolved a technique which has given very satisfactory results. The viruses worked with have been those of vaccinia, small-pox, herpes, and zoster; and although much of this work has been carried out with hyperimmune serums prepared in laboratory animals, we have been able to demonstrate the same phenomenon with serum from convalescents, though here the reaction is weaker, as one would expect. In the case of the work on zoster, convalescent serums have been used entirely because of the lack of a suitable experimental animal in which to prepare a serum. It is true that difficulties are encountered in performing this test with filterable viruses, and its application is limited in certain directions. For instance, a vaccinia antigen prepared from the brain of a rabbit inoculated intracerebrally with this virus will not, in our hands, give specific fixation of complement, although one can demonstrate that the antigen contains an abundance of active vaccinia virus. And yet this same brain antigen will produce a serum which will give good fixation with an antigen prepared from vaccinial lesions produced in the skin or testicle. The reason for this is obscure and is still being investigated, but despite these occasional anomalous findings, we consider that the reaction is virus-specific and capable of considerable service in practice. I will give some examples.

A case of encephalomyelitis was admitted to the London Hospital under the care of my colleague Dr. W. R. Brain. This patient had an extensive zoster of the head and neck, and symptoms indicative of involvement of the brain and cord which had developed subsequently to the zoster eruption. The question naturally arose whether the encephalomyelitis was due to the zoster virus or not, but since both the vesicle fluid collected from the eruption and the cerebrospinal fluid fixed complement in the presence of known zoster convalescent serums, there was little doubt that the case was in fact one of zoster encephalomyelitis. It is true that the reaction given by the cerebrospinal fluid was not as strong as that obtained with the vesicle fluid, but it was nevertheless quite definite, and cerebrospinal fluids from cases of encephalomyelitis complicating diphtheria and scarlet fever gave entirely negative results.

Recently I have had the opportunity of examining the serum of individuals who had recovered from psittacosis for the presence of specific complement-fixing antibodies, and here again I have obtained evidence of a specific reaction. Psittacosis may not be so rare a condition as is imagined, and apart from extensive outbreaks like the recent one, where the number and severity of the cases inevitably attracted attention, sporadic cases probably occur from time to time and pass unnoticed. The inoculation of animals is too slow a method to be of practical use as a diagnostic procedure, and a specific serum reaction would be a great help in clearing up the diagnosis.

It may be said that the examples given are both of rather rare conditions, but the principle is nevertheless of general application. In this brief and rather sketchy survey of the present position of research in the realm of filterable viruses an attempt has been made to show that something of practical import has been achieved. Undoubtedly an enormous amount remains to be done, but the number of workers in this field

is steadily increasing, and on every hand a determined effort is being made to gain a clearer understanding of this group of viruses. Some of the problems seem almost insoluble, but it must not be forgotten that the commonplace in bacteriology to-day must have appeared equally obscure to those who preceded Pasteur.

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DISCUSSION

DR. N. E. MCKINNON (Toronto) confined his remarks to the contribution which Canada had made to this question of filterable viruses. He spoke of the excellent work done in Winnipeg in connection with the use of convalescent serum in poliomyelitis. During the recent epidemic 66 cases received serum; only 4 of these developed residual paralysis and none died, whereas of 54 cases not receiving serum, 34 developed residual paralyses and 6 died. The dosage used was 20 c.cm. intramuscularly. Although the efficacy of measles convalescent serum was known in Canada it was not used as extensively as it should be. Between the years 1921-29 there were 5,000 deaths from measles in Canada; this considerable mortality could undoubtedly be materially reduced by the more extensive use of convalescent serum. He referred to the apparent freedom from post-vaccinal encephalitis in Canada and said that he was inclined to attribute this to the method of vaccinating. In Canada the practice was to vaccinate either by a single scratch 1/16th in. long or by single puncture; the former method was preferable, for it gave a higher percentage of takes. In conclusion, he referred to a small outbreak of psittacosis which had been thoroughly investigated from the clinical and epidemiological standpoint.

DR. D. N. NABARRO (London) spoke of the serum prophylaxis of measles. He mentioned the various sera which had been advocated—Degkwitz's serum, the serum prepared against the green streptococcus of Tunnicliff, and human convalescent serum, and said that of the three the last was the only satisfactory one. He gave the results of the use of convalescent serum at the Hospital for Sick Children, Great Ormond-street. Serum from adult convalescents alone was employed, and before being used this was submitted to filtration and stringent tests for sterility. Out of the 586 cases which had received serum only 21 were not protected, and the majority of these developed a modified measles. He considered that the use of convalescent serum was of the greatest service in hospital practice.

PROF. A. W. M. ELLIS (London) said that the question of filterable viruses could be approached from a variety of points of view. One thing which struck him most forcibly was the evidence pointing to the high percentage of carriers of filterable viruses. He instanced herpes in man, certain diseases of plants—of the potato in particular—and possibly the encephalomyelitis complicating vaccination and many of the specific fevers. The ancients had been wont to speak of disease coming from within, but advance in our knowledge of the causation of disease had reversed matters, and disease was usually spoken of now as coming from without. The evidence which the study of filterable virus diseases was bringing to light required an alteration in our conception of disease.

DR. BEDSON, in reply, said that he was in entire agreement with all that Dr. McKinnon and Dr. Nabarro had said. He considered that the point raised by Prof. Ellis was a most important and interesting one. Virus carriers did undoubtedly exist, and the evidence available suggested that the balance established between host and virus could be upset by a variety of factors with the result that disease ensued.

TREATMENT OF ALOPECIA WITH ULTRA-VIOLET RAYS.—During the past five years I have treated six cases of alopecia totalis by means of ultra-violet rays; four of these were men and two were women. The male patients were between the ages of 32 and 54 years, and had had complete alopecia for over six years before they started treatment with me. They have responded very well to treatment, and have now recovered growth of hair. The female patients were both over 50 years of age, and much more refractory to treatment. I have found that general irradiation of the skin of the body following the technique of short ultra-violet ray therapy is of greater importance than just the local treatment to the scalp and the other hair-growing areas. Many have suggested that a full erythema or blistering dose of light causing counter-irritation gives good results. On the whole, I have found that this is damaging, for during the stage when the hair just appears the blistering reaction will be followed by desquamation, and the young hairs are removed with it. The minimal erythema dose is preferable. The treatment of complete alopecias is slow and laborious, needing much perseverance, both on the part of the patient and of the physician. The patients were treated twice a week; the first signs of hair were only seen after two months' treatment, and good growth of hair was observed after nine months' treatment. It is difficult to regard this treatment as purely a local counter-irritation effect. The results suggest that there may be some activation of a hormone which stimulates the growth of hair, for in these cases the pubic hair recovered, and this area never received irradiation. The results in isolated patches of alopecia areata are well known and need no further description. I have seen some favourable results in cases of early baldness with thinning and loss of hair. This has been arrested by irradiation of the scalp combined with general irradiation of the body. I feel that the latter is of much importance in the treatment of alopecia.—Dr. Albert Eidinow, London, in *Brit. M. J.*, 1930, **2:** 940.

DIAGNOSIS AND TREATMENT OF ADDISON'S DISEASE*

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INTRODUCTION

AS an introduction to my remarks on Addison's disease, I shall quote the first and last paragraphs in the preface of the article by Thomas Addison[1] entitled, "On the constitutional and local effects of disease of the suprarenal capsules." He states, "If pathology be to disease what physiology is to health, it appears reasonable to conclude that, in any given structure or organ, the laws of the former will be as fixed and significant as those of the latter, and that the peculiar characters of any structure or organ may be as certainly recognized in the phenomena of disease as in the phenomena of health." Recognizing the fundamental importance of basing an understanding of pathology upon a thorough knowledge of physiology, he concludes, "There are still, however, certain organs of the body the actual functions and influence of which have hitherto entirely eluded the researches, and bid defiance to the united efforts of both physiologist and pathologist. Of these, not the least remarkable are the 'suprarenal capsules', the atrabiliary capsules of Casper Bartholinus; and it is as a first and feeble step towards inquiry into the functions and influence of these organs suggested by pathology, that I now put forth the following pages."

The accurate observations and interpretations made by this keen clinical investigator on the pathology of the suprarenal capsules laid the foundation for studies on the physiology of these glands. Despite the labours of a large number of investigators, which have resulted in an enormous literature, progress has been very slow in unfolding the rôle of the adrenal bodies, upon which must be based a satisfactory concept of diseases of the organs and their treatment.

In the consideration of the diagnosis and treatment of Addison's disease I shall present a new conception of the subject, based upon physiological and clinical studies on adrenal insufficiency, that I have been conducting during the past fifteen years at The H. K. Cushing Laboratory of Experimental Medicine. The view that has heretofore prevailed, and is still adhered to by a number of excellent clinicians who have occasion to study and treat this condition, is based upon the assumption that Addison's disease is chiefly a manifestation of absence or failure of function of the epinephrin (adrenalin) secretion. Our experimental studies have yielded substantial evidence that this syndrome develops in consequence of absence or lack of function of the *interrenal* (adrenal cortex) tissue rather than interference with the function of *epinephrin* secretion (from the adrenal medulla).

HISTORICAL

In 1855, when Addison called attention to the existence of the syndrome, he described a group of symptoms that are associated with disease of the adrenal glands. The significance of these symptoms, from the standpoint of interpreting the physiological disturbances which follow the loss of adrenal function, has remained quite obscure. Experimental investigation and clinical observation has, until recently, added very little knowledge of practical value in understanding and treating this disease. Much confusion has resulted from failure to consider the adrenal body as being composed of two glands, different in origin, structure and function, though anatomically united. In some lower animals (certain fishes) they exist as separate structures, the *interrenal bodies* corresponding to the cortex and the *chromaffin tissue* to the medulla of the mammalian adrenals.

The indispensability of the adrenal glands for life and health was evident from Addison's observations. His report led to experimental studies upon animals by a number of investiga-

* From the H. K. Cushing Laboratory of Experimental Medicine, Western Reserve University.

Presented before the Toronto Academy of Medicine, February 4, 1930.

tors. Surgical removal of the glands, or complete destruction by mechanical means and by cautery led to early death of the animals. These results were interpreted as confirmation of Addison's observations on the indispensability of the glands. They also led to the obvious suggestion that the glands either supply an indispensable internal secretion or that they exercise a detoxicating function, destroying certain substances which, in the absence of the glands, accumulate in the body and cause death.

In 1895 it was found by Oliver and Schafer[2] that adrenal extracts, prepared by rubbing the glands with salt solution, if introduced into the circulation of an animal, were capable of causing a striking elevation in blood pressure. These investigators observed that this effect is caused only by extracts made from the medulla of the glands, the cortical portion being ineffective. Shortly thereafter the active product of the medulla, adrenalin, was isolated and prepared in pure form. Since then it has been commonly accepted that adrenalin (epinephrin*) is the indispensable hormone of the adrenal gland, the lack of which is responsible for the condition described by Addison. This followed quite naturally from the knowledge that adrenalin has a powerful influence in raising blood pressure and that in Addison's disease the blood pressure is low. I will point out later, however, that this idea is not supported by satisfactory experimental and clinical evidence and that treatment of Addison's disease based upon this conception does not yield beneficial results.

PERSONAL OBSERVATIONS

The secretion of epinephrin from the ad renals and the conditions under which it is liberated into the blood has been extensively studied by us. Under ordinary experimental conditions it is liberated from the glands at a constant rate (average, 0.000225 mgrm. per kg. of body weight per minute).[3] This rate can be influenced through the splanchnic nerves, stimulation causing an augmented epinephrin secretion, and section of the splanchnic, interference with the secretion.[4, 5] Similar influences upon the epinephrin output from the adrenal glands can be produced through the action of certain drugs.[6, 7, 8] It has not been demonstrated, however, that this secretion exercises an indispensable function, although we have observed that it is capable of evoking certain physiological reactions, when liberated at the ordinary rate.[9] The best evidence at present available, indicating that epinephrin is a physiological secretion, can be interpreted to support the view that it may be a toxic product, elaborated by the adrenals for elimination at such a rate as is necessary to permit its destruction without exerting injurious effects. Of course, the possibility exists that, although elaborated as a waste product it may perform a function before its elimination. In this sense CO_2 may be suggested as an example.

However, when considered in view of our knowledge of the products of other endocrine organs, it is most probable that epinephrin is a physiological secretion and that it is liberated at a constant rate to perform a definite function which, however, is not indispensable for life and health. Various theories have been proposed, to explain the function of epinephrin, but none of them are supported by sufficient and convincing experimental evidence. Prominent among these is the so-called "emergency theory," proposed by Cannon. According to this theory, pain, fear, anger or the exhibition of the major emotions in any emergency results in a large outpouring of epinephrin from the adrenals, which is capable of mobilizing the defensive mechanisms of the individual. The experimental evidence upon which the theory was founded is very meagre. The method employed by Cannon and his coworkers[10, 11] to study the epinephrin secretion (withdrawal of blood from the vena cava through a catheter inserted through the femoral vein) could not be expected to yield quantitative information on the rate of epinephrin discharge from the adrenals. Since this was pointed out by Stewart and Rogoff, Cannon and his pupils have vigorously defended the theory, relying chiefly, however, upon other indirect evidence, instead of adopting methods which would enable them to offer quantitative data upon the subject which is necessarily a quantitative problem. In any case, the principal physiological reactions re-

* It is preferable to employ the term "epinephrin" as indicating the physiological secretion from the adrenal medulla, and to use "adrenalin" when referring to the commercial product.

lied upon by Cannon to prove increased epinephrin secretion from the adrenals can be obtained in animals in which the epinephrin secretion from the glands has been suppressed.

The claim that large increases in the rate of epinephrin secretion can be elicited reflexly by stimulation of the central end of the sciatic or brachial nerves, and by asphyxia, has not been supported by satisfactory experimental evidence. We have been able to demonstrate that the spontaneous liberation of epinephrin from the adrenals is governed by a centre or centres in the upper thoracic cord.[12] The existence of a spinal nervous mechanism would suggest the possibility of reflex influences upon the discharge of epinephrin from the adrenals. However, the usual experimental methods for exciting reflexes fail to demonstrate an increase in the rate of epinephrin secretion, when properly tested by actual measurements. The method employed by us for such measurements is capable of detecting significant changes in the rate of secretion if they exist. As already stated we have measured changes in the rate caused by the action of drugs and by splanchnic stimulation as well as by a number of other means. Our only conclusion can be that significant reflex increases in epinephrin secretion have not been possible to demonstrate, claims to the contrary, based upon indirect evidence or unsatisfactory experiments, notwithstanding.[13, 14]

The important, if not the only, purpose of a theory should be to stimulate investigation. To this end the various theories concerning adrenal function have been very useful. It is amazing, however, how often theory is confused with fact and the readiness with which equivocal experimental evidence is often accepted without question. This would not be so serious if limited to matters of academic interest, but it is to be deprecated when applied to the practices of medicine and surgery. Thus, it should be considered a very dangerous procedure to perform adrenalectomy in human beings for relief of certain circulatory and other disturbances, when this is done on assumptions based upon theory or upon very unsatisfactory and equivocal experimentation.

Finally, it must be emphasized that although much interesting and valuable work has been done on the secretion of epinephrin from the adrenals, its function, if it has one, is not indispensable. For it is possible to completely suppress the secretion of epinephrin in animals without causing any detectable harmful influence.[5, 15] This can be accomplished in certain animals (rabbits, rats) by double adrenalectomy. A relatively large proportion of such animals survive indefinitely the loss of both adrenals. In these there is usually found one or more small accessory bodies, consisting entirely of cortical substance. Complete removal of both adrenals, of course, results in total suppression of epinephrin secretion from the glands. Another manner of abolishing the epinephrin secretion is the removal of one adrenal and a major portion of the remaining gland. In addition, the remaining fragment is completely denervated. So long as a small portion of the cortex remains in connection with its circulation it will suffice to sustain life indefinitely and maintain the animal in good health. Removal of this cortical fragment results in death within the same period as when total extirpation is performed. There is evidence, also, from post-mortem examination of some cases of Addison's disease, where only a part of the cortex and none of the medulla of the adrenal must have been present for some time, that death ensued when the remaining cortex was destroyed or its circulation blocked. In such patients, excepting possibly during a severe acute exacerbation, and in animals that have been subjected to suppression of the epinephrin secretion and are surviving in good health, there is no evidence of any lack of capacity for exhibition of the emotions, under appropriate conditions.

It is established, by convincing evidence, that the cortex (interrenal tissue) is the indispensable portion of the adrenal gland. We have also demonstrated that this tissue contains a substance which can be extracted and is capable of prolonging life in adrenalectomized animals.[16] Further, I will present satisfactory evidence that Addison's disease is the consequence of lack of function of the adrenal cortex, not the medulla, and that the extract which I have prepared from the cortex is beneficial in treatment of patients with Addison's disease, while adrenalin (from the medulla) is either harmful or of little if any real benefit in cases where the diagnosis is quite certain.

Thus far it has not been possible to produce in laboratory animals a condition identical with Addison's disease in human beings. Total extirpation of the adrenal glands results in acute suppression of function, and partial removal of the organs results either in death, the same as with complete removal, or in recovery. If a sufficient amount of cortex to sustain life is present symptoms do not develop. Removal of anything less than the amount which suffices to sustain life is equivalent to complete ablation. I have already stated that death is due to loss of the cortex and not of the medulla. It is not surprising that adrenalectomy in animals does not produce a condition identical with Addison's disease in which suppression of cortical function is practically always a chronic process and, in a large proportion of cases, complicated by serious underlying or associated pathological conditions.

Although loss of cortical adrenal function is invariably fatal, adrenalectomised animals when properly operated upon survive much longer than has generally been supposed. All of the older reports in the literature, and, indeed, nearly all of the recent ones are unreliable. They merely demonstrate that the operation for adrenalectomy should not be undertaken by anyone unless he possesses excellent surgical skill and develops adequate technique by extensive experience. The anatomical relations of the adrenal with important structures, particularly sympathetic nerves and ganglia, render the operation for the proper removal of the gland extremely difficult. Traumatization, excessive anæsthesia, etc., may introduce serious complications. It is obvious that in reports found in the literature, adrenalectomised animals surviving but a few hours to one or two days did not die from loss of the adrenals alone but largely as the result of poor surgery. The large number of studies made upon such animals can have no value, and whenever an interpretation from such studies is later proved by satisfactory work to have been correct the interpretation can only be considered as a fortunate guess.

The animal of choice for studies on adrenal insufficiency is the dog. In this animal accessory adrenals are rarely encountered and its size permits withdrawal of satisfactory samples of blood, when desired for chemical studies. The intelligence of the dog also renders it easier to make studies on the clinical condition of the animal. In our experience dogs survive the loss of both adrenals for an average of about 12 days, the maximum period of survival being approximately two weeks.[17] No such long periods of survival are to be found in the literature on adrenalectomy performed by other investigators. We have established this control period of survival on over 200 dogs, and our studies upon these control adrenalectomised animals constitute a basis for our studies on the influence of various methods of combating adrenal insufficiency. Following the operation there is a relatively long period of good health during which the animal behaves like any healthy dog that has not been operated on. Within about one to three days preceding death a train of symptoms develop which in many respects are similar to those seen during acute exacerbations in human cases of Addison's disease. The earliest of these symptoms is anorexia, beginning generally with an aversion to fats, and leading to total loss of appetite in a day or two. Up to this time adrenalectomised animals show no change in blood pressure, but as the terminal symptoms develop the systolic and diastolic pressure become lower, diminishing each day till the end.[18] Accompanying the total anorexia the animals usually show signs of severe gastrointestinal disturbances. There is, frequently, vomiting, becoming bilious in character; diarrhœa is not uncommon and bloody stools are often seen. Muscular asthenia gradually develops and increases during the remaining two or three days, until death. Often there are evidences of severe disturbances in the nervous system. These symptoms usually begin with evidences of hallucinations, the animal developing fits of yelling, racing about in the cage aimlessly, and staring as if alarmed. Muscular twitching is not uncommon and often increases in severity leading to repeated tetanic convulsions, the animal becoming comatose. The heart is sometimes very slow, at other times rapid, and frequently there is disturbance in rhythm. On post-mortem examination profound congestion and often severe hæmorrhages are found in the mucosa of the entire alimentary canal. Ulcers in the stomach and upper duodenum are quite common, and an almost constant finding is marked congestion of the pancreas. During the period of good health of the animal no

detectable changes are found by chemical examination of the blood and urine. With the onset of the symptoms there is usually found concentration of blood, the total NPN is increased, gradually increasing to a considerable percentage toward the end; the urea N also is increased but not in proportion to the total NPN. The undetermined fraction of NPN is relatively high. There is no significant change in the creatine, creatinine, uric acid and amino-acid N. The blood calcium is usually increased and chlorides diminished; blood sugar is frequently diminished, especially toward the end of the period of survival, but the hypoglycæmia is rarely low enough to account for convulsions.[19, 20]

Our studies upon control adrenalectomised animals indicate the development of a severe and rapidly fatal intoxication. We have found[21] that life of adrenalectomised dogs can be prolonged well beyond the maximum period of survival of untreated animals by intravenous administration of relatively large quantities of physiological or isotonic salt solutions (up to 54 days). Obviously, nothing in such solutions could substitute for a specific hormone that is normally elaborated by the adrenal gland. Increasing the survival period by this treatment can only be due to dilution of toxic substances and facilitation of their elimination or "washing out". Probably also, to some extent there may be a beneficial influence upon the circulation.

Having obtained sufficient experimental evidence to leave no doubt that the condition which develops, and leads to a fatal outcome, following the loss of both adrenals is due entirely to loss of the interrenal or cortical structure, we continued our studies in an attempt to obtain from the adrenal cortex a product which could substitute for the loss of the gland. After a number of attempts, carried on over a period of years, we were finally able to demonstrate satisfactorily that certain extracts prepared from the cortex of the adrenal, when introduced intravenously in small quantities, once daily or on alternating days, are capable of prolonging life in adrenalectomized dogs well beyond the maximum period of survival of control animals.[16] The quantities of the extracts introduced was usually from 0.5 to 2 c.c. Such amounts are much too small to have contributed any beneficial influence from the introduction of fluid into the circulation. Obviously, the beneficial influence of these extracts could be due to nothing else than supplying that substance which was lacking in the animal as the result of the loss of its adrenals. Since the substance is a specific product of the interrenal tissue we have adopted as the name for this hormone "Interrenalin", which designates its origin.

In my studies on human beings with Addison's disease I have been able to correlate clinical observations with years of experience in animal experimentation on adrenal insufficiency. It has previously been indicated that the condition which follows double adrenalectomy in animals is not identical with the condition seen in human beings who have Addison's disease. In the latter case the onset is more gradual, the condition is more chronic and is very often associated with other underlying conditions or complications, most frequently tuberculosis. As already stated, in the adrenalectomized animals the condition is much more acute and the suppression of adrenal cortical function is total. Nevertheless, though differing in degree, certain symptoms already described or mentioned in the description of the condition which develops in adrenalectomized animals are very commonly seen in patients with Addison's disease, for example, muscular and circulatory weakness, gastro-intestinal disturbances, and disturbances referable to the nervous system, including hallucinations, convulsions and coma. I have observed in nearly all my patients with Addison's disease that they have an aversion to fatty foods. This is a common symptom occurring in adrenalectomized dogs and is of interest in view of the previously mentioned condition of the pancreas found at post-mortem examination of animals that died in consequence of removal of the adrenal glands. In Addison's disease of very short duration, where there was an acute suppression of adrenal function or acute destruction and degeneration of the glands, I have seen at autopsy similar, though less intense, congestion of the pancreas and of the gastro-intestinal mucosa.

DIAGNOSIS

The diagnosis of Addison's disease, when all of the symptoms described by Addison are present, should present very little difficulty. Yet, it is surprising how often a classical picture of this malady escapes recognition, doubtless because the condition is comparatively rare, and the clinician who has not a special interest in this disease is not on the look out for it. It must be stated, however, that if properly recognized it would be found that the condition is more common than has been generally supposed. It has often been stated, in the past, that Addison's disease is rarely diagnosed before autopsy, I can hardly agree with this statement although it might be considered not without foundation from the number of relatively easy diagnoses that have been missed and from the comparatively large number of cases that have been referred to me as Addison's disease which proved to have been improperly diagnosed. I am convinced that a number of claims of "cure" in cases of Addison's disease fall into this class. I do not, however, deprecate the diagnosis of Addison's disease in doubtful cases when symptoms warrant suspicion and cannot be accounted for by differential diagnosis. In such a case it is preferable to err in favour of this diagnosis, giving the patient the benefit of early treatment, should the diagnosis prove to have been correct. Nevertheless, I am satisfied that not only can the condition be usually diagnosed with certainty but that the pathology of the adrenal glands can often be predicated from the clinical symptoms and the course of the disease. I have demonstrated this to a number of colleagues in Cleveland by suggesting the probable pathology some time before death in a number of cases in which my prediction was confirmed at autopsy. I might add, also, that in a number of cases that were presented to me as Addison's disease, in which I was unwilling to agree with the diagnosis, autopsy revealed that the adrenals were not diseased. I make these statements only to emphasize that the correlation of satisfactory experimental work with clinical studies has afforded a much better comprehension of this disease than might have been possible without the aid of experimentation upon animals.

The characteristic symptoms of the syndrome described by Addison are "anæmia, general languor and debility, remarkable feebleness of the heart's action, irritability of the stomach, and a peculiar change of colour in the skin." Quoting further from his report:

> "It occurs in both sexes generally, but not exclusively, beyond the middle period of life, and, so far as I at present know, chiefly in persons of somewhat large and bulky frame, and with a strongly-marked tendency to the formation of fat. It makes its approach in so slow and insidious a manner that the patient can hardly fix a date to his earliest feeling of that languor which is shortly to become so extreme. The countenance gets pale, the whites of the eyes become pearly, the general frame flabby rather than wasted; the pulse, perhaps, large, but remarkably soft and compressible, and occasionally with a slight jerk, especially under the slightest excitement; there is an increasing indisposition to exertion, with an uncomfortable feeling of faintness or breathlessness on attempting it; the heart is readily made to palpitate; the whole surface of the body presents a blanched, smooth and waxy appearance; the lips, gums, and tongue seem bloodless; the flabbiness of the solids increases; the appetite fails; extreme languor and faintness supervene, breathlessness and palpitations being produced by the most trifling exertion or emotion; some slight œdema is probably perceived about the ankles; the debility becomes extreme. The patient can no longer rise from his bed; the mind occasionally wanders, he falls into a prostrate and half-torpid state, and at length expires. Nevertheless, to the very last, and after a sickness of, perhaps, several months' duration, the bulkiness of the general frame and the obesity often present a most striking contrast to the failure and exhaustion observable in every other respect."

Up to the present time, little, if anything, has been added to this description of Addison's disease that is helpful in the diagnosis of typical or atypical cases of the malady or in the recognition of the disease in its incipient stages. Diagnosis, when made, has generally depended upon the existence of cutaneous pigmentation together with muscular asthenia, low blood pressure, and sometimes gastric disturbances, as reported by Addison and described in textbooks. *It should be recognized that this combination of symptoms, when present in a patient as manifestations of adrenal insufficiency, must be regarded as evidence of well advanced disease of the glands.* It is very desirable, therefore, to obtain information concerning the underlying physiological disturbances and the significance of the symptoms, in order to better comprehend the condition and, if possible, to recognize it earlier, also to recognize atypical cases. This I have hoped to facilitate by correlating our experimental work upon animals with clinical observations upon Addisonian patients. The results of years of study can be considered only

a beginning in this direction, but the progress made is encouraging and the information obtained affords a better understanding of the pathology of Addison's syndrome, its diagnosis and treatment.

Experience has led me to believe that the statement made by Addison concerning the occurrence of the disease "generally beyond the middle period of life," and "chiefly in persons of a somewhat large and bulky frame", is incorrect. His statement is obviously based upon a number of cases, included in his report, that cannot be considered as cases of adrenal insufficiency. Out of the eleven cases, described by him, not more than six can be admitted to have been genuine Addison's disease, and one of these, a patient over fifty years of age, is doubtful because death may have been due to tuberculosis of the intestines, although both adrenals were also involved. The others were under the middle period of life. Of the five cases which I do not consider as cases of Addison's disease and which constitute the basis for the statement that the disease occurs in later life, four died of cancer and one of tuberculosis. *In all of these five cases only one adrenal was involved.* Contrary to Addison's suggestion, I have found that the disease occurs much more frequently *before* the middle period of life, and with one exception, I cannot say the cases I have seen occurred in individuals of a large and bulky frame, although extreme emaciation is rather rarely encountered.

I desire to call attention to two symptoms, not heretofore described, one of which I consider quite important because of its relative constancy in human cases as well as in experimental animals, the other perhaps less important because of its probable significance. The first of these symptoms is an *aversion to fatty food.* I have found this symptom present in nearly all cases of Addison's disease that have come under my observation since my attention was attracted to it in our experimental animals. Careful interrogation of patients, avoiding leading questions, often reveals the occurrence of this among the earliest symptoms to develop, together with beginning languor, anorexia or nausea. When muscular and circulatory asthenia, pigmented skin, and gastric irritability are already present aversion to fatty food is a common symptom. The patient may state that a dislike has been developed for milk, or that cream with breakfast cereal is not tolerated, and only lean meats, fish or white meat of chicken can be eaten, whereas previously cream, milk, or fatty meats were eaten without discrimination. This symptom is of considerable interest and I believe of significance, in view of the fact that we have found, almost invariably, a profound congestion of the pancreas at autopsy in doubly adrenalectomised animals, and to a lesser degree in some Addisonian patients. The other symptom mentioned is also quite common. Upon moderate pressure in the costo-lumbar angle a dull ache or pain is elicited especially on the side where at autopsy it was found that the adrenal had been undergoing extensive caseous degeneration or suppuration.

As is the case with experimental animals, patients with Addison's disease show little or no significant change in blood chemistry during remissions or periods of improvement under treatment. When a patient is manifestly declining, or during a period which will ultimately lead to an acute exacerbation, as well as during an exacerbation, I have often found an increase in the total NPN, urea N and the undetermined fraction of the NPN, as well as a moderate hypoglycemia and sometimes a moderate hypercalcemia. This, and the gradual onset of symptoms which increase in severity, the character of the symptoms, their resistance to previously employed treatment, and the results of our investigations upon experimental animals, all lead to the conclusion that Addison's disease is the manifestation of a severe intoxication resulting from loss of adrenal cortical or interrenal gland function. This interpretation finds much more support from clinical and experimental evidence than the old idea that Addison's disease is the manifestation of a lack of circulating epinephrin (adrenalin) in the body, and upon it is based the treatment that I have employed with greater success than has been attained by other methods of treatment heretofore recommended.

TREATMENT

In my earlier experience, patients with Addision's disease who came under my observation were treated by the methods usually employed, but without satisfactory results. Administration of adrenalin and commercial products of adrenal glands proved practically worthless. Indeed, nearly every case that is at

present referred to me has been previously treated in this manner. Any supposed beneficial influence from such treatment has been easily explained by the spontaneous improvement which these patients may undergo from time to time. Inasmuch as I am convinced that lack of circulating epinephrin is not responsible, in any important way, for the condition seen in Addison's disease, none of the patients under my treatment receive adrenalin in any form. They are treated entirely on the basis of the results of our experimental work and very encouraging results have been obtained up to the present time.

My treatment consists in the administration by mouth of "Interrenalin", an extract of the interrenal tissue, or cortical portion, of sheep or beef adrenals. This extract is a modified preparation of the product which we found most potent when used intravenously in the treatment of adrenalectomized dogs. In addition to the administration of interrenalin I employ intravenous injections of relatively large amounts of physiological salt solution, or Ringer's solution, to which is usually added about 2 to 6 per cent of dextrose. These injections are employed when a patient manifests the development of intoxication, or during an acute exacerbation. The value of such injections was demonstrated in the prolongation of life and amelioration of symptoms in our adrenalectomised dogs. A number of cases of Addison's disease have been treated with interrenalin alone, and others with the intravenous injections alone. The intravenous injections have been found to be only of temporary benefit and are very useful during an acute exacerbation or in the beginning of treatment of a case, to facilitate elimination of accumulated toxines. Interrenalin gives much more lasting benefit and when employed without the intravenous injections has yielded much more satisfactory results than when the injections alone were given. The advantage of supplementing the treatment with interrenalin by intravenous injections of physiological or isotonic solutions when needed is too obvious to require further comment.

In a recent communication[22] I reported some results obtained in a small group of cases by treatment with interrenalin. These results are obviously much better than any hitherto obtained by other forms of treatment in undoubted cases of Addison's disease. Since this report was published I have added a few more cases to my group in which equally promising results have been obtained.

Time will not permit giving details of my records but a very brief abstract from a tabulation will be of interest. Thus, of the six cases that I have mentioned as genuine cases of adrenal insufficiency, in the group reported by Addison, the duration of life from the onset of symptoms was at the longest two years, and in the others from six months to one year. In a group of eight cases that came under my observation before I began treating the disease with interrenalin the duration of life was approximately the same as in Addison's cases. Of six cases that had some treatment with interrenalin, but were obviously in the advanced stages of the disease when treatment was begun, the duration of life in each respective case was as follows: 1½ years, 1 year, 2½ years, 3 years, 2 years and 2 years. In eight cases, in which the diagnosis of Addison's disease cannot be doubted, that are at the present time under my treatment, the duration of the disease since the onset of symptoms has been respectively as follows: 1¾ years, 2 years, 2½ years, 3½ years, 3¼ years, 6 years, 3 years, 1 year. Not only is life being prolonged in these cases of Addison's disease but the symptoms in most cases are decidedly ameliorated. In some there has been considerable reduction of pigmentation of the skin. The least favourable results have been obtained in blonde individuals, who do not seem to develop the skin pigmentation as readily as individuals of dark complexion when afflicted with Addison's disease. I have been led to consider the prognosis in blondes much more unfavourable, having found that the disease is apparently much more rapidly fatal than in brunettes.

The previously mentioned figures on the duration of the disease in treated and untreated cases can leave no doubt that progress is being made in our knowledge of the physiology and pathology of the adrenal glands, and that treatment of disease of these glands may be more hopeful in the future than in the past. It is scarcely necessary to mention the fact that the result of treatment in a given case of Addison's disease is very largely influenced by the char-

acter and degree of the underlying or associated pathological lesions. When there are active or extensive tuberculous processes or malignancy present favourable progress cannot, of course, be expected. Doubtless, also other factors, at present unknown, must influence the results of treatment in some cases.

In conclusion, it is proper to emphasize that the advantages afforded by modern experimental medicine cannot be overestimated, and it is to be hoped that Addison's disease, like other diseases which have hitherto resisted all efforts to combat them, will ultimately yield to appropriate treatment.

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DIAGNOSTIC POINTS IN GYNÆCOLOGY*

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AN apology is almost expected nowadays from the reader of a paper if he deals with a clinical subject from a purely clinical point of view and has not something to give in the way of statistics or of more or less advanced biochemical, bacteriological, or serological studies. I shall make no apology, because I think that it becomes more and more necessary that we should get back from time to time to simple clinical observations and study these in relation to diagnosis and treatment. I have it increasingly impressed upon me that the training of our medical students to-day is erring on the side of teaching them to rely too much on laboratory investigations and too little on clinical observation. Do not for a moment think that I believe the former to be unnecessary—every accurate observation of any kind in relation to a patient is of value and the laboratory observation is likely to be more accurate than the clinical one in the hands of the average man. It is in the interpretation of these observations that error is likely to creep in, and to counteract this tendency, clinical observation and, what I may call "clinical sense" are necessary. We all know the thoroughly scientific physician or surgeon who without this "clinical sense" will investigate in the most thorough way a particular case and yet may miss the essentials of it. We also know that the pure clinician who cannot or will not make use of modern scientific methods will fall into error in many instances. The properly equipped practitioner is he who possesses both "clinical sense" and scientific training. Medicine is becoming more and more an exact science but it will never absolutely attain to it because we are dealing with individuals, each of whom differs in some way from all the rest. However accurate our scientific methods become, the erratic, incalculable, human element will always remain and an understanding of it will always be necessary.

* Read at the annual meeting of the Ontario Medical Association, Toronto, May, 1930.

PAIN

Take for instance the symptom of pain. This always requires careful investigation, first as to its real existence, and second, as to its severity, its exact site, and its relation to various functional activities. What may be interpreted as pain by one patient may be regarded as only slight discomfort by another. When this is the only symptom complained of, we must be very sure before we undertake any operative treatment for its relief that what we propose to do is likely to relieve it. In a very large number of gynæcological and lower abdominal lesions, backache and pain over the brim of the pelvis on one or both sides are present, but these symptoms may exist without any palpable anatomical abnormality in the pelvic organs. Therefore, when we do discover some definite anatomical or pathological lesion, such as a retroverted uterus, we must not at once jump to the conclusion that by the correction of this we are necessarily going to afford complete relief. We are happily getting away from the idea that pain low down in one or on both sides of the abdomen is probably ovarian, that right-sided pain and tenderness are invariably indicative of appendicitis, and that in a woman with backache and a retroverted uterus the latter is necessarily the cause of the former.

A constant or nearly constant dull ache in the lower abdomen or back is often indicative of some lack of support of an organ or structure—a dragging on its mesentery or vascular attachment. The ptosis which so results often leads also to passive congestion. The two together may give rise to considerable pain and aching. The characteristic of such pain is that it is aggravated by long standing or by fatigue and is relieved by lying down, or by supporting the abdominal walls with the hand or with a properly applied belt or corset. Such pain may be due to a movable kidney, a prolapsed atonic cæcum, a retroflexed prolapsed uterus, or a prolapsed ovary. Each of these conditions may exist alone, but quite frequently two or more are present in the same patient. I have been struck with the frequency of atonic prolapsed cæcum in cases of uterine prolapse. I believe this is a condition which ought to be looked for in every such case and remedied when present. In many of those cases the lower end of the cæcum is so low and so distended as to be easily felt between the hands on vagino-abdominal examination, giving a peculiar gurgling sensation on bimanual palpation.

The same sort of symptoms may be present, without any actual displacement of organs, as the result of a varicose condition of the pampiniform plexus, with a consequent impairment of the venous return. This condition, as in the male, is commoner on the left than on the right side. When asked to describe the pain the patient assumes a characteristic attitude, bending over towards the affected side and placing her hand on the lower abdomen to support it. Bimanual examination may reveal an indefinite soft fullness in the upper part of the broad ligament, and in some cases the distended veins may be felt. This condition, as I say, may exist alone or it may be associated with the other conditions mentioned. It is something which ought always to be looked for, not only before but after the abdomen has been opened. It is often missed owing to the veins emptying themselves when the patient is in the Trendelenburg position.

Now a large number of parous women have permanently relaxed abdominal walls with a certain degree of ptosis of all the abdominal and pelvic organs. As a result they suffer from this type of chronic ache. They are relieved by properly directed exercises and by the use of a supporting corset or belt. In cases where operative treatment of prolapsed pelvic organs has been perfectly carried out the ache may remain if the abdominal wall is neglected in the post-operative period. It should be a rule to examine all such cases in the erect position, when the sag of the wall is easily demonstrated.

The other great cause of dull aching pain in the lower abdomen is chronic inflammation, with its resultant fibrous overgrowth and condensation of tissue. Here it would be well to interject a protest against the diagnosis of ovaritis in so many cases of pain low down over the brim of the pelvis. How often is a patient put off with this diagnosis and various office "treatments" applied, or the ovary sacrificed at operation. It is time that we all realized that the ovary is not subject to inflammation except when infection has extended to it from contiguous structures, notably the tube

and the appendix. We are not justified in making a diagnosis of ovaritis unless we get a definite history of trouble in these structures and find on examination tender, thickened, and fixed organs. In many cases where a diagnosis of ovaritis has been made and the ovary removed there has been relief from the pain, but the same end could have been attained and the ovary saved had the organ been suspended when prolapsed, or had the offending veins in the broad ligament been ligated and excised, in cases of varicocele. Ovaritis is always accompanied by salpingitis or appendicitis and the condition in tube or appendix is the primary one.

In chronic inflammation of the female pelvic organs the pain is usually aggravated for a day or two before the menstrual periods and relieved after the flow is well established. The point of tenderness on palpation is low down over the brim of the pelvis, below McBurney's point, and there is always thickening, fixation and tenderness to be detected on bimanual examination. The detection of such thickening and tenderness on the right side does not exclude a diagnosis of appendicitis, for a pelvic appendix may lead to a pelvic inflammation, and one frequently finds the appendix adherent to a tubo-ovarian inflammatory mass, but in the vast majority of cases a definite thickening felt on the right side of the uterus on vagino-abdominal examination means a tubal rather than an appendiceal condition.

The so-called "cystic ovary" in itself seldom gives rise to definite symptoms; the condition of chronic inflammation and thickening of the capsule which, in some cases, leads to the cyst formation may cause pain. The chocolate cyst of the ovary is an exception however. This we now know, thanks to the work of Sampson, is due to the growth in the ovary of endometrial tissue which menstruates. Such a cystic ovary is invariably adherent to surrounding structures. It causes constant pain, aggravated in the premenstrual and menstrual period. A history of such pain occurring in a woman who has not hitherto suffered in this way, and in whom an infection from below can be excluded, together with the detection of a tender, large and fixed ovary, is practically diagnostic of this condition. In such cases removal is the only means of relief.

A very common cause of pain low down over the brim of the pelvis is a lacerated, catarrhal cervix. It has been my teaching to students for many years that when a parous woman comes complaining of such pain we must at once think of the possibility of this condition and have it constantly in mind in the investigation of the case. Cervical catarrh in the virgin may cause the same symptom. We are too apt to regard leucorrhœa and perhaps menorrhagia as the only symptom of cervical catarrh. In my experience, pain low down, especially on the left side over the pelvic brim, is just as common. Such patients are usually in poor health; they are anæmic and flabby, easily tired and nervous. The pain is more marked in those cases where the laceration extends to the vaginal fornix and there is scar tissue at the bases of the broad ligaments. A properly executed repair or amputation gives relief. It must, however, be borne in mind that along with this condition of long standing cervical catarrh there is often a chronic metritis or fibrosis of the uterine body. This will be indicated by severe and intractable menorrhagia and the presence of a large, hard, heavy, often tender, uterus. In such cases complete hysterectomy gives the most certain relief. Radium or x-ray therapy will stop the hæmorrhage, but not always, in my experience, the chronic ache and general ill health from which these patients suffer.

I need only refer to the necessity in all cases of abdominal pain of excluding cystitis and especially pyelitis and ureteritis. These are conditions which are commoner in the female than in the male, especially in those recently confined. Very often a pyelo-ureteritis is present without cystitis and there are no bladder symptoms. These are the cases which are apt to be missed. Palpation of the kidney, examination of a catheter specimen of urine, and catheterization of the ureters will settle the diagnosis.

There remain a number of cases in which more or less constant pain in the lower abdomen is present, and in which we can find no definite evidence of the existence of any of the previously mentioned conditions. Yet these patients may suffer quite as much as those having lesions such as we have described. What then is the explanation? Is it not simply this? that in such individuals the spinal centres for the pelvic organs are in a state of hyperexcitability so

that the normal stimuli reaching them from these organs produce exaggerated effects. The stimuli overflow to the sensory and motor cells in the neighbourhood, which also become hyperactive, so that pain, tenderness, and muscular contraction are reflexly induced in the area supplied by these nerves. The hyperexcitability of these spinal centres is usually but a part of a more general affection of the nervous system, and this is, in turn, but a part of a general want of adjustment throughout the other systems of the body. There is something fundamentally wrong in the actions and interactions of the various organs. In many there are distinct stigmata of arrested development or maldevelopment and, undoubtedly, in many these and other defects in structure and function are due to a disturbance of the endocrine system. Such cases require careful and prolonged study, for we are still very much in the dark as to how to determine the particular gland or glands which may be at fault, and how to correct that fault by the means at our disposal.

In such cases it is obvious that local treatment is useless and that surgery has no place; and let me say here that gynæcologists are by no means the worst offenders in failing to recognize this. How often have we seen such patients started on their downward career of yearly or half-yearly abdominal operations by the general surgeon, who labelled the case chronic appendicitis and removed the appendix, nearly always with relief from symptoms for, at any rate, the duration of the patient's stay in bed. With a recurrence of pain the case is labelled "adhesions" and the abdomen again opened. The pain again recurs and the right ovary is removed, and then the left, and so it goes on until the abdominal wall looks like a gridiron. The patient is usually worse at the end of her operative career than at the beginning and is certainly poorer. The man who starts a patient on such a program is taking a great responsibility on his shoulders. It takes strong conviction to advise the patient against that first operation, for she is ready to fall in with any suggestion which holds out the slightest hope of relief.

ACUTE CONDITIONS

Coming to acute conditions in which pain is a prominent symptom the chief are, in order of frequency: salpingitis, ectopic pregnancy, twisting of the pedicle of an ovarian tumour, hæmorrhage from a ruptured Graafian follicle. All of these are associated with acute pain in the lower abdomen, accompanied by the other symptoms of a severe peritoneal lesion. When they occur on the right side a differential diagnosis must be made between them and acute appendicitis and acute pyelitis. The last condition is one of common occurrence, especially during pregnancy, and ought to be thought of in every case presenting acute pain on the right side, of sudden onset and accompanied by high fever.

It is extremely difficult to state categorically the distinguishing points between salpingitis and appendicitis. In making a differential diagnosis there is no question that what I have called "clinical sense" plays a great part, and it is not easy to put into words just what this is. In salpingitis there is usually a history of infection, gonococcal or septic, and, if no definite history can be obtained, evidence of the former condition may be found in the cervical or urethral discharge when showing the characteristic organisms. There may be little or no difference in the degree of pain the patient complains of, but in the case of appendicitis the face of the patient is more anxious and drawn; she looks more distressed. In salpingitis she may be flushed. The temperature is as a rule higher—up to 102° or 103°, which is rather the exception at the beginning of appendicitis. Leucocytosis is as a rule higher in salpingitis than in appendicitis. Tenderness is lower down in salpingitis, and there is less rigidity of the muscles than in appendicitis. The tenderness and rigidity often extend beyond the midline, and may be as marked on the left as on the right side when the tube or tubes are the seat of infection.

A careful recto-vagino-abdominal examination will practically always reveal characteristic findings in cases of salpingitis—marked tenderness in the fornix or definite thickening. When these are present on both sides it is strong presumptive evidence of tubal rather than appendiceal infection. When these are associated with the finding of gonococci in the urethral or cervical smears the diagnosis is clinched.

Tubal pregnancy usually presents such a typical clinical picture as to be easily diagnosed —a period of amenorrhœa followed by slight

irregular vaginal bleeding, accompanied by cramp-like abdominal pain, terminating at the time of rupture in sudden severe pain, nausea, faintness, and collapse, and other symptoms of shock. On examination a tender mass is felt to one side of the uterus. There are, however, atypical cases where, for instance, the irregular bleeding begins before the patient has missed a period and where the sudden severe pain is not preceded by lesser cramps. These are cases of early rupture usually in the isthmic portion of the tube. So small is the swelling that nothing definite can be felt on bimanual examination, and the diagnosis must be made simply on the evidence of shock and internal hæmorrhage. This evidence may not include areas of dullness in the flanks or over the pubes. These usual signs of free fluid in the abdomen may be entirely absent even when the peritoneal cavity is full of blood. The blood remains among the coils of intestine and often does not gravitate to the flanks as ascitic fluid does. Slight vaginal bleeding is one of the important things in the history of a case of tubal pregnancy, and in my experience is nearly always present. Such bleeding may also occur in inflammatory conditions of the tubes and ovaries, and, as there is a history of pain and a mass can be felt on examination, differential diagnosis may be difficult. A leucocyte count and observation of the temperature may help, but not always, as some rise of temperature and a polymorphonuclear leucocytosis may be present in cases of tubal pregnancy.

Mistakes occasionally occur in the differential diagnosis of intra- and extra-uterine pregnancy. It must be remembered that in the early months of pregnancy the uterus sometimes contracts irregularly, one half being contracted and the other relaxed, giving the impression on bimanual examination that there are two swellings in the pelvis. We have met this difficulty several times. A second examination after a short interval, or next day, reveals the true state of affairs, for then we usually find the uterus either contracted or relaxed uniformly.

Along with ectopic pregnancy one should mention those very rare cases of extensive hæmorrhage from a ruptured Graafian follicle. In such cases a positive diagnosis is hardly possible until the condition has been actually seen at operation which is undertaken simply on the indication of an acute intraperitoneal lesion.

Torsion of the pedicle of an ovarian cyst usually presents no difficulty in diagnosis. Many of the cases are missed and only diagnosed after the abdomen is opened because a rectal or vaginal examination has been neglected in the course of examining the patient. Very often the tumour is not of such a size as to reach into the abdomen, and can only be detected by such an examination. We have noted that in two cases the torsion was accompanied by a slight vaginal bleeding, as in the case of ectopic gestation, but this is not the rule.

BACKACHE

The interpretation of the symptom of pain in the back in women may be quite difficult. Backache is so common in association with such conditions as retroflexion of the uterus, prolapse, pelvic cellulitis, chronic metritis, etc., that we who practise gynæcology are apt to forget that it may be due to other causes, and are surprised to find it persist after the supposed causal conditions have been corrected. As in the case of lower abdominal pain, a relaxed abdominal wall and visceroptosis are among the commonest causes, and are usually overlooked. Postural defects play a part. In the case of parous women overstrain of the sacro-iliac joints on one or on both sides is not infrequent, or the lumbo-sacral articulation may be the one at fault. Every case of backache ought to be investigated with these things in mind.

HÆMORRHAGE

Taking up now the symptom of bleeding I intend to mention only a few conditions in which after careful inquiry into its nature, time of occurrence, and character, it may be interpreted as being due to certain definite conditions. In teaching students the groundwork and elementary part of a subject I believe in being dogmatic, leaving to a later stage of their course the discussion of exceptions to the general rules laid down. I believe that in this way we give them a point from which to start in their investigation of cases, and an idea of the lines their interrogation of a patient ought to follow. They are encouraged to build up a clinical picture. When the different parts do not blend to form the picture of which they thought at

first they must try to blend them to form another, always remembering that along with symptoms must go physical signs and other diagnostic aids. In this way a certain train of symptoms calls up in their minds the possibility of certain conditions and the case is investigated with these in mind, but not to the exclusion of other possibilities which may emerge as the investigation proceeds. Every clinician, consciously or unconsciously, practises this method. Thus, when we say that menorrhagia in young girls is almost invariably due to an endocrine maladjustment and not to a pathological lesion of the uterus, we are making a broad generalization which will ensure that this aspect of the case will receive the consideration that is its due, and that we shall not at once plunge into surgical procedures, such as curettage which, in the vast majority of instances, will do more harm than good. When we say that constant or irregular bleeding in a woman in the twenties or early thirties is more likely to be due to pregnancy than to a fibroid tumour it ensures a consideration of the case from this point of view and may save some from a disastrous laparotomy. When we teach that in early pregnancy a patient with profuse hæmorrhage and slight pain is almost certainly aborting, while one with slight bleeding and intense pain may have an ectopic gestation we may expect that a careful physical examination of every case presenting these two symptoms will be made with these possibilities in mind. When it is stated that prolonged bleeding in the puerperium is probably due to a retroflexed uterus there is reasonable hope that the student will make a pelvic examination instead of continuing to dose his patient with ergot and pituitary extract. In many instances he will find the retroflexion, correct it, insert a pessary, remove it at the end of six weeks and effect a complete cure. If he interprets the symptom as due to retained membranes, or simple sub-involution, and has not the other probability in mind, no examination may be made; the retroflexion is unrecognized and remains permanent. If he is taught that a fibroid tumour causes menorrhagia and not metrorrhagia he will investigate very carefully every case presenting the latter symptom, having in mind the possibility of there being an accompanying carcinoma of body or cervix, or sarcomatous change in the tumour itself—all conditions which profoundly influence the operative procedure to be adopted.

It has to be emphasized that irregular bleeding from the vagina under all circumstances must suggest the possibility of malignant disease. All of the cases of cancer of the cervix in pregnancy which I have seen have been overlooked for weeks or months because of this failure to realize that, although the patient has a certain evident condition, *viz.*, pregnancy, which may cause bleeding, other conditions may be present as well which may be responsible for the symptom.

We are frequently consulted by women at the menopause who are suffering from excessive and irregular bleeding. The question that has to be settled in such individuals is whether that bleeding is menstrual in origin, or whether it may be a symptom of new growth, and especially of a cancer of the cervix or body of the uterus. Every patient presenting herself with these symptoms should have a most careful and complete pelvic and general physical examination. This is sufficient to exclude gross cancer of the vagina and the portio vaginalis of the cervix. It tells us nothing of the upper reaches of the cervical canal or of the endometrium. Information regarding these can be got only by a dilatation of the cervix and curettage of the uterus followed by histological examination of the tissue removed.

Under what circumstances is it our duty to recommend and urge this? In what instances may it safely be dispensed with? It is necessary to formulate some sort of answer, otherwise we should on the one hand miss some early cases of cancer or, on the other, subject a very large number of women to needless operation. In general terms it may be stated that if the bleeding is periodic, lasts only a certain definite number of days and then stops, is preceded and accompanied by the feelings the patient has learned to associate with menstruation, then, no matter how excessive it may be, it is menstrual in character. Such excessive bleeding is not caused by carcinoma of the endometrium. It may be caused by a fibroid tumour, by a fibrous polyp, by fibrosis uteri, or by a cystic glandular hyperplasia. In these cases the amount of blood loss and its effect upon the patient will be the determining factor

for or against diagnostic curettage and further surgical or radiological treatment.

Again, if a woman has apparently had the menopause established after a period of irregularity, and then, four, six, or eight months later, again has vaginal bleeding a careful pelvic examination must be made. If such examination reveals nothing abnormal in cervix or vagina we are justified in waiting a short time before urging a curettage. If the bleeding stops in a few days and there is no recurrence we can conclude that it is a belated menstruation. On the other hand if it continues for over a week, or stops in a few days and then recurs, no matter how slightly, diagnostic curettage ought to be urged.

If uterine bleeding of any character occurs more than a year after the menopause and nothing can be found on ordinary pelvic examination to account for it we fail in our duty to our patient if we do not advise exploration of the uterus. In this connection let me urge that even when an apparent explanation for the bleeding is found, such as a small cervical mucous polypus, it be not concluded that that is the only cause of the bleeding. I have seen in consultation two patients who had such polypi removed by their doctors in their offices, who continued to bleed, and who both turned out to have carcinoma of the endometrium. I make it a rule to remove such polyps with the patient under a general anæsthetic and at the same time to do a curettage and examine microscopically the tissue removed. If we remember the simple fact that cancer of the uterine endometrium or of the cervix bleeds because it ulcerates and that, therefore, the bleeding is independent of, and unrelated to, menstruation, we shall be in less hesitancy as to the type of case in which exploration of the uterus is obligatory. In a case of advanced fibrosis of the uterus, with actively functioning ovaries, there is practically continuous bleeding, because the blood vessels of the endometrium opened up as the result of one menstrual stimulus have not closed before the next stimulus arrives. In such a case a diagnostic curettage is the only means of distinguishing it from carcinoma or other uterine lesion.

A fibrous polypus projecting from the cervix and ulcerating, causes intermittent or continuous bleeding and such polypi are most often found in women at or after the menopause. The atrophy of the uterus in the post-menopausal period is a factor in extruding such tumours from the uterine wall and out through the cervical canal. It is interesting to note that very often such tumours are found in women who have had several children—the type of patient in whom one least expects to find the ordinary fibroid during active sexual life.

The only other bleeding condition to be mentioned now is senile endometritis, a condition occurring some years after the menopause in a uterus which has undergone extreme atrophy and in which, as a rule, the cervical canal is occluded by plastic adhesions. This occlusion of the cervix is not permanent or complete, for it apparently allows access to the uterine cavity of organisms of decomposition which acting on the necrosing lining of the uterus produce an extremely fetid discharge. This may escape into the vagina from time to time. In nearly all cases it is blood-stained as result of deep ulceration into the uterine wall. The occurrence of such fetid blood-stained discharge in a woman past the menopause of course at once conjures up the picture of cancer. It is only on diagnostic curettage that that diagnosis can be excluded.

BLADDER SYMPTOMS

I am going to touch on just one more set of symptoms, *viz.*, those referable to the bladder. Frequency and pain on urination are far commoner in the female than in the male because of the higher incidence of cystitis due to *B. coli* infection. But what I want to refer to more particularly are mechanical disturbances taking the form of incontinence of urine and retention.

Urinary incontinence is a very frequent condition in parous women. It is present in at least 80 per cent of cases of cystocele, and may be quite marked in women without gross prolapse of the bladder. The least strain, such as lifting a weight, making a sudden movement, stepping up or getting down from a street car, coughing or laughing, may result in the uncontrolled escape of a few drops or of quite a stream of urine. The same lack of control is occasionally found in nulliparous women, but it

is much rarer in them than in those who have borne children. In my experience this lack of control is due to a defect not in the sphincter itself but in its fascial attachment to the back of the pubes. As the result of labour this fascial support has given way and the neck of the bladder sags away from its proper attachment. The rest of the bladder may or may not be prolapsed in the form of a cystocele. The sphincter has lost its "point d'appui" and so fails to act efficiently. According to this interpretation the treatment of these cases should be by restoring this fascial support and most gratifying results are obtained by the repair of the pubo-cervical layer of fascia, paying particular attention to that part which supports the neck of the bladder.

Retention of urine may be hysterical, but is usually due to a mechanical cause. As a rule there must be more than direct pressure on the urethra or neck of the bladder. There must be a lifting up of the bladder and an elongation and kinking of the urethra in addition. The most common cause is undoubtedly a retroflexed gravid uterus and in such the symptoms are usually so definite and clear cut as to be diagnostic: a period of three or three and a half months' amenorrhœa, a history of gradually increasing bladder irritability, followed by a complete inability to void and, perhaps, later on an overflow incontinence. The next most common cause is a cervical fibroid. Here again there is a history of bladder irritability and frequency of urination, usually most marked at or before the menstrual periods, one or two minor attacks of temporary inability to void at the periods, followed by complete retention which has to be relieved by catheter. The patient is usually in the late thirties, and she is often nulliparous; there is usually no history of menorrhagia or other menstrual symptom.

In contrast to the relative frequency with which a mechanical obstruction of the bladder may occur is the infrequency of rectal obstruction. It has somehow come to be generally believed that a retroflexed uterus mechanically causes constipation. I have never yet seen an ordinary retroflexion which could possibly do so. Even in those cases of impacted retroflexion in gravidæ just referred to, with absolute retention of urine, I have never seen rectal obstruction. Nor have I seen it in cases of fibroid tumours filling the pelvis. True, a great many of these women are constipated, but not more so than an equal number of women with none of these conditions present. When the pelvis becomes choked bladder obstruction and not rectal obstruction is the rule. Rectal obstruction nearly always implies an infiltrating growth, such as cancer.

ETIOLOGY OF PUERPERAL SEPSIS.—In an attempt to determine the actual source of infections arising during the puerperium Joan Taylor and H. D. Wright report the following findings. In the vagina in 1,123 women immediately before delivery were found non-hæmolytic, hæmolytic, pseudo-hæmolytic, and anærobic streptococci in 37.8, 2.7, 1.3, and 1.1 percentages respectively. Pseudo-hæmolytic strains, producing no hæmolysis in serum broth but definite hæmolysis on the plate, were present in 22 patients, of whom 20 subsequently had an afebrile puerperium, one had mild sepsis due to another organism, and one had pyelitis. Of 32 patients harbouring true hæmolytic streptococci, 29 had an absolutely apyrexial puerperium; of the other three, one had staphylococcal mastitis, and in another instance a sore throat and fever developed on the fifteenth day. Of thirteen women in whose vaginas anærobic streptococci were found, three later developed fever, but none from infection with an anærobic streptococcus. It would appear, therefore, that streptococci present in the vagina before delivery do not usually produce infection. After delivery, on the third day, streptococci were present in the vaginal flora in slightly increased proportions; especially was this the case with anærobic streptococci, but clinical evidence of infection was absent in patients having these bacteria in the uterus or vagina. In respect of cases of puerperal morbidity (as defined by the B.M.A. standard), the authors found that of 125 cases 50 were certainly, and 27 others probably, due to an extrauterine cause. Of the remaining 47 definitely septic cases, 14 were caused by hæmolytic streptococci, 10 by anærobic cocci, and 8 by *B. coli*. In none of the fourteen septic cases in which hæmolytic streptococci were obtained did death ensue, and only about half were of moderate severity; of the five (hospital) cases in which ante-natal bacteriological examination had been made, none had then shown the presence of hæmolytic streptococci. It appears that the bacteria present in the vagina before delivery are a less serious danger than those entering during or after labour. Stress is laid on the importance of anærobic organisms and the relative infrequency of hæmolytic streptococci. A prognosis based on bacteriological findings alone is said to be almost invariably deceptive.—*J. Obst. & Gyn. Brit. Emp.*, Summer No., 1930, p. 213.

AVERTIN*

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THE production of general anæsthesia is almost invariably effected by the inhalation of volatile substances. This method has attained popularity for two reasons; first, on account of the wide therapeutic margin of the volatile drugs available, and secondly, on account of the facility of administration which permits the anæsthetist to control and regulate accurately the depth and duration of anæsthesia. Furthermore, absorption by this method is almost as rapid as by intravenous injection.

Non-volatile anæsthetics must be given either by the mouth, the rectum, or intravenously, the choice of method being governed by the properties of the individual anæsthetic. There are three groups: (1) liquids with too high a boiling point for administration by the lungs, paraldehyde being an example of this group; (2) alkaloids such as morphine and hyoscine; and (3) solid substances, often very insoluble in water, which act by virtue of lipoid solubility. This last group includes chloral and its derivatives chloretone, chloralose, and isopral; sulphonal and methylsulphonal; veronal with its derivatives sodium veronal, luminal, and pernocton; and urethane with its derivative hedonal.

All these drugs are excellent hypnotics, but as a general rule they are unsuitable as anæsthetics because the therapeutic margin is insufficient. A dose that will produce insensibility and render the patient free from pain does not necessarily produce a corresponding degree of immobility; in some instances the anæsthesia lasts so long that the use of the drug is impracticable. Unless a non-volatile anæsthetic can be administered by continuous intravenous infusion it must be given in a single dose, usually per rectum, and this has the disadvantage that when it has been absorbed it is impossible to control its action further. In addition, there is always the risk of local irritation upon the rectal mucosa. Such non-volatile drugs cannot be excreted rapidly, if at all, by the lungs; they are eliminated comparatively slowly by the urine, sweat, or fæces. For these reasons it is impossible to ensure a constant concentration of the anæsthetic in the blood and tissues, a condition easily attained when volatile anæsthetics are employed; with this group, therefore, it is impossible to maintain the patient at a constant level of anæsthesia without the risk of overdosage. The quantity to be administered must be calculated in proportion to the body weight of the patient; this method is the best at our disposal, and yet it is unscientific, because it takes no account of his age, temperament, or infirmity. Further, if we accept the view that anæsthetics act by virtue of lipoid solubility, the obesity of the patient must be taken into consideration when estimating the correct dose. There is no need for accurate dosage with a volatile anæsthetic, because there is a close correlation between the amount administered and the depth of anæsthesia. With such difficulties to overcome the introduction of a new non-volatile anæsthetic may appear unnecessary, but it must be remembered that even volatile anæsthetics do not give entire satisfaction. If the ideal anæsthetic is considered as one which is absolutely safe for the patient, produces complete insensibility and immobility, and is simple in administration the defects of the volatile type are at once apparent, and therefore the properties of any new anæsthetic should be critically examined.

Avertin, or tribromethylalcohol, is one of the latest non-volatile anæsthetics; it was first prepared by Willstatter and Duisberg[25] in 1926 by the reduction of bromal. It is an odourless white crystalline powder containing 85 per cent of bromine, and soluble in water to the extent of 3 per cent at 37° C.; but the powder dissolves very slowly, taking more than forty-five minutes, though aided by vigorous shaking, to produce a clear solution. This was a serious disadvantage,

* A paper read in the Section of Anæsthesia at the combined meeting of the British and Canadian Medical Associations at Winnipeg, August 29, 1930.

but the drug is now issued already dissolved in amylene hydrate in the proportion of 1 gram of avertin in 1 c.cm. of the solvent. This solution is readily soluble in water; moreover, it presents the additional anæsthetic effect of amylene hydrate, which also stimulates the respiratory centre and tends to counteract the depressant action of avertin upon respiration. The drug is given in aqueous solution by the rectum; it is peculiarly suited to this form of administration because it is non-irritating to the mucosa, and it is absorbed therefrom within a very short time. Further, the therapeutic margin is greater when the drug is given in this manner.[12] Anæsthesia can also be produced by intravenous, subcutaneous, or oral administration, but although these methods have been used for animals they are not so convenient for man.

Solutions of avertin must be freshly prepared without the use of heat; heating above 40° C. and exposure to light and air cause decomposition of the drug into dibromacetaldehyde and hydrobromic acid. Both these substances are intensely irritant to the rectal mucosa, and many of the earlier difficulties in the use of avertin by rectal administration were due to their presence. If a solution of avertin is decomposed by heat and injected into a cat's rectum an acute hæmorrhagic proctitis results in a very short time. It is therefore important to be quite sure that a stable solution is being used, and before administration is must be tested for its reaction by adding two drops of a 1 in 1,000 solution of Congo-red to 5 c.cm. of avertin solution. If the reaction is less than pH = 4.5 (due to the presence of hydrobromic acid) the indicator gives a purplish or blue colour and the solution must not be used, but if the orange-red colour of the Congo-red is unchanged the solution is satisfactory. A 3 per cent solution of avertin is commonly employed, because the required quantity of the drug can then be given in the smallest possible volume; it is probably better, however, to administer a 2.5 per cent solution, because in this concentration the drug is more evenly absorbed by the rectal mucosa.[21]

DOSAGE

Correct dosage is a matter of considerable importance, for avertin is no exception to the general rule that when once an anæsthetic is given by the rectum it is impossible to control its action. No variation in the degree of narcosis can be effected by withdrawing any free avertin from the rectum, for the drug is absorbed completely by the time surgical anæsthesia is reached. When avertin was first introduced doses of 0.15 gram and over per kilogram of body weight were commonly used, in the mistaken belief that full surgical anæsthesia could be obtained with safety. It has since been realized that this dose is unsafe for general use; 0.1 gram per kilo is safer and, for general purposes, more satisfactory, because, although it produces complete anæsthesia in only 30 per cent of cases,[5] the other 70 per cent are in such a state of narcosis that a very little additional volatile anæsthetic serves to produce complete anæsthesia. This dose may now be taken as the standard for healthy patients, but for cachectic and exhausted patients, whose glycogen reserves are diminished and whose powers of detoxicating avertin are impaired, it is sufficient to administer 0.08 gram per kilo.

Although the smaller doses now given may be relied upon to produce deep narcosis they do not always produce full surgical anæsthesia. This may be achieved in one of two different ways; either by supplementing avertin by an inhalation anæsthetic, such as nitrous oxide or ether, or by utilizing Butzengeiger's method of giving small additional doses of the drug per rectum (for example, 0.025 gram per kilo) at fifteen-minute intervals.[5] This intermittent method is not generally used, probably on account of the trouble and time required and the grave danger of administering an overdose. Avertin should therefore be regarded as a particular form of premedication which will produce deep narcosis upon which full surgical anæsthesia can be superimposed by other methods.

It is generally agreed that 10 grams should be the maximum quantity of avertin administered to each individual irrespective of weight, though in certain cases the usual dose may safely be exceeded. The most important of these is exophthalmic goitre, where doses of 0.2 gram per kilo, and even more, can be given without ill effect; in tetanus it can be given in still larger doses, when it reduces the number and severity of the spasms without unduly depressing the respiration. A case of tetanus has been reported[17] in which a total of 63.8 grams was

given during a period of twelve days to a child weighing 20 kilos; this represents an average daily dose of 0.28 gram per kilo.

Many drugs have been employed as adjuvants previous to the administration of avertin in the attempt to produce full surgical anæsthesia. Veronal and its derivatives, morphine, and hyoscine have all been used extensively in this connection. If morphine is first injected smaller quantities of avertin than would otherwise be necessary are required, but it has the grave disadvantage of accentuating the depressant action of avertin upon the respiratory centre. It is therefore inadvisable to use morphine as a premedicament unless the dose is restricted to 1/8 grain.

THE ANÆSTHESIA

The induction of anæsthesia by means of avertin is most pleasant for the patient and easy for the anæsthetist. The pressure of the mask upon the face and the odour of the anæsthetic are abolished, while the administration of an appropriate quantity of the warmed solution is associated with no inconvenience to the patient. The solution, which has been prepared and tested by Congo-red, is slowly run by gravity through a rubber catheter into the rectum. No obvious change occurs in the patient for ten or fifteen minutes after the administration is completed; after this interval he begins to feel drowsy, and gradually lapses into unconsciousness. There is usually no preliminary excitement or struggling. The respiration becomes slow and shallow, and a slight degree of cyanosis may be noticed. Anæsthesia deepens, and the operation may commence about half an hour after the administration was started.

At this stage it is necessary to consider whether an additional anæsthetic is required or not. The usual signs of anæsthesia are unreliable, for, although the corneal reflex may be absent, a painful stimulus may elicit reflex movement and indicate that anæsthesia is not complete. According to Blomfield and Shipway[4] the best test is to apply a mask well wetted with ether to the face; if the breathing remains quiet the operation can begin, but if there is any holding of the breath full surgical anæsthesia has not been obtained, and it is necessary to continue with ether or some other anæsthetic. In any circumstances, a much smaller quantity of inhalation anæsthetic will be used than otherwise would be the case.

The blood pressure in man falls 10 to 20 mm. Hg, and a comparable fall occurs in both cats and rabbits; Bender states[1] that this is due to loss of vasomotor tone, but my own experiments[18] indicate that it is due to a central cardiac effect, and not to dilatation of the peripheral blood vessels. Avertin has a definite action upon the heart; it causes a slight increase, followed immediately by an appreciable diminution, in the force of the beat, which is accompanied by a slowing of the rate. In the isolated rabbit's heart this effect is marked when it is perfused with a 1 in 2,500 solution. Continuous perfusion with a strength of 1 in 1,250 causes arrest of the heart in systole within five minutes, an effect which is produced by chloroform in a dilution of 1 in 20,000. It appears, therefore, that so far as its action upon the cardiac musculature is concerned, avertin is about sixteen times safer than chloroform.

Respiration is markedly affected; it is very shallow, and the rate may fall to 8 or 10 per minute. After the administration of a normal dose the centre still retains all its reflex effects and its response to drugs; in man the administration of ether by inhalation produces quickening of the respiration, while in animals inhalation of ammonia and the injection of hydrocyanic acid still produce quickening and deepening of respiration, while the stimulation of an afferent nerve, such as the vagus or sciatic, elicits the normal response. If, however, the limits of safe dosage have been exceeded the respiration, in animals, shows that type of breathing known as apneusis. The animal first takes a normal inspiration, which is followed not by a normal expiration, but by five or six extremely short expirations and inspirations; a normal expiration then occurs, and the process is repeated. Toxic doses of avertin cause death from respiratory failure, and it is important, therefore, to keep respiratory stimulants at hand when administering this drug.

The anæsthesia is very satisfactory for the surgeon, because muscular relaxation is complete, and it is comparable with that observed in chloroform anæsthesia. The pupil in both man and animals occupies the midway position, but with toxic doses it is contracted. A cat dies with pin-point pupils, and this affords a

strong contrast with the dilated pupils which result from the administration of toxic doses of other anæsthetics. This is due to a central effect, for there is no action upon the pupil when an aqueous solution of avertin is instilled into the conjunctival sac.

With a dose of 0.1 gram per kilo anæsthesia is said to persist for about one and a half hours.[21] The patient subsequently passes into a deep sleep, from which he can be roused with difficulty, and which lasts for some hours. There are usually no undesirable after-effects, and vomiting or nausea seldom occurs. Avertin acts as an analgesic after operation; it is therefore of considerable value in diminishing post-operative pain and in abolishing the use of morphine for this purpose. Further, the patient has no recollection of being anæsthetized, because avertin causes amnesia.

THE FATE OF AVERTIN

It has been shown by Straub[22] that avertin is absorbed by the rectal mucosa quicker than the water in which it is dissolved; accordingly, anæsthesia is produced with great rapidity. The subsequent course of events is uncertain, but it is stated[13] that the drug is detoxicated in the liver by combination with glycuronic acid. It has been observed[20] that the duration of narcosis is longer in fasting animals on account of the diminished glycogen reserves, and this explains why a smaller dose of avertin is efficient for cachectic patients. The converse, however, is not true, for the administration of glycuronic acid, glycogen, or cane sugar to a patient under avertin has no effect upon the duration of anæsthesia,[20] and consequently these substances are of no value for detoxication.

There is no doubt that avertin is excreted by the kidneys; a sufficient quantity of bromine can be recovered from the urine to account for 98 per cent of the ingested avertin.[24, 18] Traces of bromine, however, can be found in the sweat and breath.[23] The drug is not excreted unchanged, or as inorganic bromide, for neither of these substances can be demonstrated in the urine. The constant presence of glycuronic acid in the urine suggests that avertin is excreted as urobromalic acid—a compound formed by the union of tribromethylalcohol with glycuronic acid—but tests for this substance fail to prove its presence. The assumption, therefore, is that the drug is excreted as a complex organic compound of bromine.

At one time it was thought that avertin circulated in the blood stream as sodium bromide and was excreted as such.[7] The suggestion was therefore made that the rectal administration of a solution of sodium chloride to a subject anæsthetized with avertin would diminish the period of unconsciousness and lead to a more rapid recovery from anæsthesia. This depends upon the fact that bromides are excreted in the urine *pari passu* with chlorides, and if the rate of excretion of chloride is raised that of bromide will follow. It would be easy, therefore, if the drug circulated as inorganic bromide, to bring an anæsthetized patient to consciousness as required, a matter of considerable imporatnce in view of the long period of narcosis following the injection. It is now certain that avertin does not circulate as sodium bromide, and hence the subsequent administration of sodium chloride has no effect upon either the duration of anæsthesia or the rate of excretion of bromine.[18]

The concurrent administration of certain inorganic salts with avertin, however, has an effect upon the anæsthesia; if potassium or magnesium salts are given with the drug less is required. Again, it has been shown[2] that the withdrawal of calcium and sodium salts from the body has a similar action.

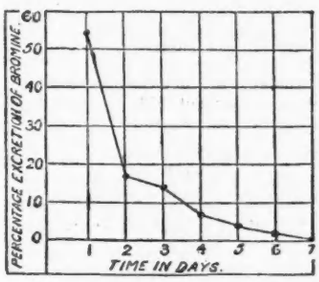
It has been suggested that certain other drugs are useful in detoxicating avertin, and both thyroxine[19] and caffeine sodium benzoate[8] have been used for this purpose. Probably the former is the more encouraging, because patients suffering from exophthalmic goitre bear avertin anæsthesia extremely well, and can safely take far greater doses of the drug than can be tolerated by the normal individual. Carlton suggests that the bromine in avertin saturates the thyroxine.[6] Caffeine sodium benzoate, also, has been found to interrupt avertin anæsthesia in animals, and to stimulate respiration when this function is profoundly depressed, but personally I regard this suggestion with some misgiving, because it is now well known that the administration of caffeine in alcoholic and other forms of coma accentuates the toxic effect.

Avertin is excreted at a comparatively slow rate; experiments show that between 50 and 70 per cent is excreted in the first twenty-four hours following administration.[18] Bromide is

found in the urine in progressively diminishing quantities until about the seventh day (see chart), and therefore, since the drug is cumulative, great care should be observed in administering a second dose. In spite of this, several instances[11, 14, 17] have been recorded in which large doses of avertin were given on successive days without ill effects to patients suffering from tetanus.

THE PRESENT POSITION OF AVERTIN

All rectal anæsthetics possess definite advantages over inhalation anæsthetics because, as already pointed out, the administration is more agreeable to the patient and simpler for the anæsthetist. Avertin is preferable to other rectal anæsthetics because it does not irritate the mucosa, and it is unnecessary to wash out the rectum before administration or after the operation. The preparation of solutions of avertin for injection is not difficult, if the solution in amylene hydrate is used, but it requires some care. Preparation, testing, and administration should be carried out by the anæsthetist and not delegated to a nurse.



Graph showing the rate of excretion of bromine in a rabbit weighing 1.8 kilograms after the subcutaneous administration of 0.4 gram of avertin (=0.346 gram bromine).

Induction is most pleasant for the patient, because there is no excitement or struggling and the only sensation appreciated is that of falling asleep. The anæsthesia is characterized by excellent muscular relaxation, which, for abdominal surgery, is accentuated by slow and shallow respiration. The usual undesirable post-anæsthetic effects seldom occur, but, on the other hand, the patient requires constant attention on account of the prolonged coma.

Serious drawbacks to the use of avertin as a routine anæsthetic are those concerned with detoxication and elimination. From a study of the literature Lundy[15] has calculated that the death rate intrinsic to avertin, after making all allowances for the submission of bad risks to operation, is about 1 in 3,333. Hewitt's figures,[9] published nearly forty years ago, for the intrinsic death rates of chloroform and ether are 1 in 3,162 and 1 in 16,302 respectively. Accordingly both avertin and chloroform anæsthesia have a similar risk to life which is much greater than that due to ether; it is evident that avertin is not an anæsthetic for general use when others at our disposal are much safer.

Unlike chloroform, avertin has little effect upon the heart; its danger depends upon the fact that it is so slowly destroyed and eliminated. It should therefore not be used when there is disease of the liver or kidneys, which hampers these processes. As avertin produces marked respiratory depression its use is inadvisable when there is extensive disease of the lungs; nor can it, of course, be given when local disease of the rectum or colon prevents satisfactory administration.

There are certain conditions, however, in which avertin has a definite advantage over other anæsthetics, and the most important of these is exophthalmic goitre. In this disease anæsthesia can be produced with the least possible distress, and the excess of thyroxine present detoxicates the drug and minimizes the risk of toxic symptoms; the absence of any deleterious effect upon the heart is an additional advantage. Avertin is of value in operations about the nose and throat when the use of inhalation anæsthetics is inadmissible; in spite of prolonged coma and depression of respiration it is stated[3] that it can be used in these cases without anxiety. Further, it is useful in certain abdominal conditions because of the absence of post-operative sickness.

It is possible that some persons are unduly sensitive to avertin, for, even when allowances have been made for the unsatisfactory method of calculation, administration of the usual dose of 0.1 gram per kilo does not necessarily produce the same degree of narcosis in different subjects; for example, in some cases unconsciousness is not obtained, while in others death has occurred for no apparent reason.[10, 16] This is a point which might well be investigated further.

My object in this paper is to indicate the relative advantages and disadvantages of solid as opposed to volatile anæsthetics. Avertin is perhaps the best of the solid anæsthetics which have been made available up to the present time, and, although it is not so satisfactory for routine use as the volatile inhalation anæs-

thetics commonly employed, it is of particular service in the conditions which I have mentioned.

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DISCUSSION

DR. J. S. LUNDY (Rochester Minn.) stated that although the death rate for avertin for the first 30,000 cases was 3 in 10,000, this figure might conceivably be reduced considerably in the future. He had ceased to administer avertin in aqueous solution, and now gave it in 6 per cent gum acacia. Since adopting this practice he had seen no case of tender anus following administration.

DR. R. WATERS (Madison) stated that he had used avertin intravenously. In a very few minutes the patient was anæsthetized, but detoxication was rapid, and in approximately ten minutes the patient had regained consciousness.

The CHAIRMAN said his impression was that avertin was of considerable value for induction, and for this purpose it was the most pleasant anæsthetic we possessed. In his opinion the ether test was too severe. He preferred to give small doses of avertin. During the recovery period the patient, although anæsthesia was light, had muscular relaxation, and it was necessary to watch the jaw. He had had rectal irritation even when the solution had been most carefully prepared. He asked if the solution of avertin in amylene hydrate deteriorated in the course of time.

DR. HAYES (New Zealand) asked what effect avertin had upon young children.

DR. S. JOHNSTON (Toronto) questioned its value in nose and throat operations on account of the delayed return of the cough reflex. He inquired if there was any appreciable fall in the blood pressure.

DR. BOTSFORD (San Francisco) felt that avertin was of less value than sodium amytal or other barbiturate preparations. Patients did not regain their normal mental outlook for some days. A disadvantage, so far as America was concerned, was that avertin could not be administered by a nurse.

DR. PARSONS, in replying, stated that avertin could be given to children provided the rules concerning dosage were observed. There was very little fall in blood pressure during anæsthesia. The solution in amylene hydrate was permanent.

INDICATIONS AND CONTRAINDICATIONS FOR SPINAL ANÆSTHESIA*

BY JOHN PARRY,

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THIS paper is a review of 500 cases of spinal anæsthesia done in the last three years, and comprises practically the same number of cases as had been done in the thirteen years previous to April 1, 1927. My experience with spinal anæsthesia, although not very extensive, therefore covers a considerable period of time. The first cases were done in 1914, as a result of a visit to Dr. Babcock's clinic in Philadelphia.

In the beginning, the anæsthetic was limited to three types of cases, which certainly could not be considered first class risks, namely, hypertrophy of the prostate, acute intestinal obstruction, and amputation of the lower extremities for senile and diabetic gangrene. My experience was so satisfactory that up to the present time I have rarely used any other anæsthetic for these conditions. Other operations below the umbilicus were done only when gas or ether was contraindicated. It was not until 1928 that I started using Pitkin's solution, "Spinocain," which made possible any operation below the diaphragm. This, of course, greatly enlarged the sphere of the anæsthetic, and as a result many operations have been done which were impossible before.

It is true that in the ideal case spinal anæsthesia is a perfect form for intra-abdominal work, as it is accompanied by complete relaxation of the abdominal muscles. The surgeon is enabled to view an abdominal cavity with contracted intestines, rather than forced to contend with

* Read at the annual meeting of the Ontario Medical Association, Toronto, May, 1930.

escaping distended coils. The result is that strenuous packing off of the abdominal viscera with gauze sponges and violent tugging on retractors is entirely eliminated. Not only is surgery rendered easier technically but the time consumed at operation is shortened. For instance, a gastric resection has been done in fifty minutes, and cholecystectomy in a woman weighing 180 pounds, with a complete operation, in 16 minutes after the solution had been injected into the spinal canal. The dread of a general anæsthetic, so feared by many, is not present, and frequently the patient is not aware that the operation has been begun when he is told it is all finished. Many patients have told us that it was nothing at all. Convalescence is all that can be desired. Vomiting and tympanites are at a minimum, as are also chest complications. An anæsthetic that is capable of such ideal results offers wonderful possibilities, and I predict for spinal anæsthesia improvements and much more widespread use in the near future.

CASES SUITABLE FOR SPINAL ANÆSTHESIA

Indications for spinal anæsthesia must be considered as relative. Nearly all cases in which the operative field lies below the diaphragm are suitable for this type of anæsthetic. At present, operations above the diaphragm are not advisable. However, in one case I performed a double amputation of the breasts in addition to cholecystectomy without any difficulty.

Whatever danger is associated with spinal anæsthesia is largely the result of vasomotor depression, and, consequently, the more vasomotor nerves paralyzed, the greater the potential danger. Therefore, the lower the segmental nerve block, the safer the case should be. With this idea in mind, spinal anæsthesia has been employed in earlier cases where perineal and rectal surgery is called for, and also in amputation of the lower extremities. When these operations are required in individuals past middle life, spinal anæsthesia is by all odds the method of choice, not only because the operation is rendered easier but because convalescence is relatively free from distressing pulmonary complications. For lower abdominal surgery, it is ideal. For upper abdominal work, I have found it very useful and have employed it satisfactorily in the following cases: exploratory laparotomies, 22; resections of the stomach and gastroenterostomies, 23; cholecystectomies, 12; and cholecystostomies, 8; intestinal, comprising surgery of the small bowel, colon, and Kraske operations, 30; nephrectomies, 7. With the possible exception of cholecystectomies, (not including cholecystostomies) I could not wish for anything better. In some few cases of cholecystectomy and common-duct surgery, I have caused the patient some pain by traction on the gall-bladder, necessitating some inhalation anæsthesia for a short time. In gastric resections and gastroenterostomies, few difficulties were experienced. The slower operator should bear in mind before he undertakes a difficult gastric resection that the duration of the anæsthesia cannot be counted on for more than 1¼ to 1½ hours. Toward the close of the operation spinal anæsthesia may be pieced out with some inhalation form. The combination of spinal and inhalation anæsthesia, particularly where the former has commenced to wear off, I do not believe to have jeopardized the patient to any degree, certainly not in our series of cases, nor in those of Sise and others, who individually report many instances where supplementary anæsthesia was required. In the surgery of the lower abdomen, it has proved even better in: hysterectomies, 43; Cæsarean sections, 5; appendectomies, 51; prostatectomies and bladder cases, 51; hernias of various kinds, 53. In addition, I have done numerous vaginal and rectal operations, fractures and dislocations of the lower extremity, including plating of femora, making a total since April 1, 1927, of 500 operations under spinal anæsthesia. Just at this point I would like to recommend the use of 1 c.c. of spinocaine in the case of cystoscopic examinations in the male. I have never failed to produce perfect anæsthesia for this disagreeable procedure.

CONTRAINDICATIONS

Contraindications to the use of spinal anæsthesia are few, and when they are carefully considered, one might conclude that any form of anæsthesia, except possibly regional or infiltration anæsthesia, was also contraindicated. In its present status, I do not believe that spinal anæsthesia should be used for operations above the diaphragm, nor as a rule in cases suitable for local anæsthesia.

Patients in a profound state of shock, or suffering from the effects of a severe hæmorrhage

with low blood pressure, are thought by some authors to offer a contraindication to the spinal method. However, it is questionable whether immediate operation with any type of anæsthetic is justified here, at least before suitable pre-operative treatment has been administered. We must be honest with ourselves in airing the disadvantages and dangers of a new anæsthetic, for in the final analysis it must be compatible with a surviving patient. Age does not offer any special contraindication. I have used it in patients whose ages ranged from 3 months to 86 years. Excellent results have been obtained in the intussusceptions of infants on several occasions, and prostatectomies in old men have been done most satisfactorily.

In my experience, contraindications are few; they require but short comment as they are quite obvious: (1) ankylosis of spine rendering spinal puncture impossible; (2) infections in the back over the site of puncture making meningitis possible; (3) disease of the spinal cord (where, in the event of paralysis supervening, spinal anæsthesia may be blamed); (4) the patients' refusal to submit to the procedure.

TECHNIQUE OF ADMINISTRATION

The patient is prepared for the operation in the usual way. Three hours before operation he receives 7 to 10 grains of luminal. This is reinforced by ¼ of a grain of morphine just before operation. The result of these sedatives is a modified "twilight-sleep". Arriving in the operating room, the patient is placed upon his side and the skin of the back cleansed surgically, and draped. A preliminary dose of ephedrine is then administered. The dose of spinocain depends upon the intensity of the anæsthesia desired and the expected duration of the operation, and, also, upon the size of the individual, for in a general way, the taller the patient, the larger the dose. For minor procedures, such as cystoscopic examinations, 1 c.c. is sufficient; for any intra-abdominal operation, we practically always give at least 2 c.c., and have no hesitancy in giving 3.

We have found that by piercing through the interspinous ligament with the tack described by Sise, there is a definite advantage over using the ordinary heavy lumbar puncture needle. The tack permits the skin and tough interspinous ligament to be penetrated, but is not long enough to pierce the dura. By making use of this method, it is possible to insert a fine needle and stilette through the lumen of the tack and this penetrates the dura. The resultant trauma to the dura is only a fine hole, which closes spontaneously, if one keeps the bevel pointed toward the ceiling so as merely to split the longitudinal fibres of the dura.

I believe this modified technique for spinal puncture reduces post-operative headaches to a minimum. Unless the spinal fluid runs out very slowly, our custom has been to withdraw a quantity of fluid equal to the amount of novocaine solution to be injected. To produce anaæsthesia suitable for upper abdominal surgery, I usually inject the solution in the routine way and then withdraw three to four c.c. of spinal fluid and re-inject this, so as to disperse the novocaine upward in the cord. This procedure is not necessary where only the lowest nerves of the cord require blocking.

Once the solution is injected the patient must not raise his head until the effects of the anæsthetic have passed off completely. Where it is desired to anæsthetize only the lowest nerves, the patient may be placed in five to ten degrees Trendelenburg immediately. Where, however, upper abdominal surgery is contemplated no Trendelenburg posture is employed till sufficient evidence is present to indicate a satisfactory level of anæsthesia. Thereupon, it is best to prevent further anæsthesia, and upward progress of the novocaine by lowering the table to five to ten degrees.

Usually sufficient anæsthesia is obtained in ten minutes from the time of the injection. However, the anæsthetic action may be delayed for as long as twenty minutes, but at the end of that time, your patience is rewarded by perfect anæsthesia. In a few cases, where, for one reason or another, the surgeon does not care to wait till anæsthesia has taken full effect, we infiltrate the skin area with ½ to 1 per cent novocaine and then make the incision. By the time the peritoneum is opened, the spinal anæsthesia will be found to be effective.

COMPLICATIONS DURING OPERATION

The risk in spinal anæsthesia is that of cerebral anæmia. This is due, of course, to paralysis of the vasomotor fibres that come off from the second dorsal to the third lumbar

segments. That efforts should be made to forestall any serious drop in blood pressure is to be emphasized, as it is much simpler to prevent a vasomotor collapse than to remedy the condition when once established.

MEASURES TO PREVENT OR CORRECT VASOMOTOR COLLAPSE

1. *Ephedrine.*—The most striking systemic action of ephedrine is to raise the blood pressure. A single intravenous injection of one-tenth of a mgm. per kilo. will raise the blood pressure in a dog as much as 100 m.m. Hg. and maintain the increase for 15 to 20 minutes. Experiments show that in some cases the increase in blood pressure may be maintained for hours. The rise is not only due to vasoconstriction, but also to cardiac stimulation. The action on the heart resembles that of epinephrine, and is essentially similar to the effect of electrical stimulation of the sympathetic nerve.

Although ephedrine bears a close resemblance pharmacologically to epinephrine, yet clinically it differs in one or two important features. Once the blood pressure has fallen in spinal cases, it is much more readily restored by epinephrine than by ephedrine. Secondly, the pressor effect of epinephrine is quite fleeting as compared with that of ephedrine. The practical application is that epinephrine is used when there is marked fall of blood pressure during operation, but that preliminary dosage of ephedrine should be given before instituting spinal anæsthesia. Since ephedrine has come into general usage in spinal cases, epinephrine is now but seldom required to combat the drop in blood pressure.

2. *Use of a slowly diffusible novocaine solution.*—Pitkin found experimentally that when spinal fluid, normal saline, or distilled water was injected intrathecally, it quickly mixed with the spinal fluid of the sub-arachnoid space, so that any dissolved substances, such as novocaine, would as quickly diffuse over the spinal cord. These observations threw considerable light upon the difficulty of controlling the degree of anæsthesia produced by novocaine given intraspinally. By tedious experiments, Pitkin ultimately discovered that a solution containing starch (gliadin), alcohol and novocaine diffused so slowly in the subarachnoid space that it did not permeate the spinal fluid for from 30 to 40 minutes, by which time the novocaine was usually well fixed in the nerve sheaths. The alcohol made the solution of lighter gravity than the spinal fluid so that the contents of an injected ampoule would tend to rise in the spinal canal, and, consequently, by placing the patient in the Trendelenburg position or the reverse the height of the solution in the spine could be controlled readily. In addition it became unnecessary to inject the solution above the second or third lumbar segment and thus risk puncturing the cord itself.

Although we have had almost universal success so far as the slow diffusibility of the Pitkin's solution is concerned, nevertheless, we have seen anæsthesia extend upwards very rapidly. On several occasions the patient was anæsthetic as high as the fourth rib almost as soon as he was placed on his back. On the other hand, twenty minutes may be required before a satisfactory degree of anæsthesia is forthcoming. The causes of these discrepancies need more study. It is possible that the normal anatomical curves of the spine are a factor, and that some are more abrupt than others. So far as our experience is concerned, we do not see in the rapidity of the ascent any definite relationship to high or low pressure.

3. *The use of the Trendelenburg position.*—The employment of this position in conjunction with an anæsthetic solution whose specific gravity is lighter than spinal fluid is absolutely essential. Pitkin estimated that it required 9 to 11 seconds for his solution to rise from the lumbar to the cervical region when the patient is in the upright position. All vasomotor nerves controlling the blood vessels in the body are given off the spinal cord from the level of the second dorsal to the third lumbar segments. Consequently the higher the anæsthesia, the greater the number of paralyzed vasomotor nerves. However, when controlled, spinal anæsthesia does not paralyze all the nerves, and, in addition, the employment of ephedrine offsets to a great extent the vasomotor depression. Cerebral anæmia is prevented by placing the patient in the Trendelenburg position. A minimum of blood to the extremities is of no consequence for the duration of the operation, provided the vital centres are nourished.

COMPLICATIONS AND THEIR TREATMENT

These may be divided into three groups: (1) those occurring during operation; (2) during immediate convalescence; (3) several weeks or more after operation.

The most important of these groups is the first. As a general rule they occur within 30 minutes following the injection of the novocaine, and are usually associated with a marked fall in blood pressure. For this reason, it is always necessary to have some responsible person watching the patient continually, as lack of supervision may be fatal. Complications are usually first noted by a marked drop in blood pressure. In a general way a systolic blood pressure of 80-90 is satisfactory, 60-70 questionable, while 50 is unsatisfactory. Maintenance of blood pressure at the original preoperative level is not necessary. To prevent a severe drop in blood pressure is much easier than to re-establish it once it has fallen to any marked degree.

Circulatory collapse when present is treated as follows: The anæsthetist or the physician responsible for blood pressure observations gives the alarm, and the patient is placed in a more exaggerated Trendelenburg position. If no response is obtained in a few minutes, a hypodermic injection of 0.5 to 1.0 c.c. of 1-1,000 epinephrin solution is administered. If no satisfactory result is obtained from the hypodermic injection, intravenous saline or glucose becomes at once necessary.

Occasionally we have seen patients who complain of weakness and depression, although the blood pressure has been maintained satisfactorily. Often they have an anxious expression with slight perspiration from a cold skin, which has a dusky cyanosed appearance. Vomiting is an occasional accompaniment. These cases we have treated just as though there was a depressed circulation, and in every instance the symptoms proved to be transitory.

The operation over, the patient is taken to his room, still maintaining the Trendelenburg position. The foot of the bed is raised and the patient kept in this position for three hours, by which time the effect of the novocaine has worn off, and whatever position the surgeon may desire for his patient may be assumed. Dizziness and headache occasionally arise. The treatment is simple and consists in keeping the patient in the horizontal position. Ten grains of aspirin are useful to combat the headache, which by the way does not seem to be nearly as frequent as in my early experience. I have never needed to use morphine. I feel sure that the decrease in the frequency of headaches is the result of using a finer lumbar puncture needle, and thus eliminating the leakage of spinal fluid. Very exceptionally, post-operative vomiting may last for 24 hours, but as a rule, absence of vomiting is a feature.

We have had three cases in whom rather puzzling complications arose several weeks after discharge from the hospital. All three occurred in prostatics in whom operation and convalescence were uneventful. These cases were characterized by severe pains in the legs and thighs on movement. There was a definite paralysis in one case, but no loss of sphincter control. In view of the fact that these cases occurred in men suffering from urinary sepsis, I shall review them a little more in detail.

CASE 1

The first case was in a man of 84, who developed pains in his legs two weeks after his return home. These pains were first noticed on getting in and out of bed or arising from a chair. Later, they were so severe that he was confined to his bed for about three weeks. Gradually the pains eased, and at the end of another three weeks they had disappeared entirely. The patient lived six years more, to the age of 90, and was quite active and well, able to get about, and showed no further signs of the trouble.

CASE 2

The next case was that of a man of 59 with hypertrophy of the prostate, who had catheterized himself for several months, and whose bladder was in a very filthy condition. He was treated in the hospital for four weeks, and at the end of that time, was considered ready for operation, although his bladder still contained a good deal of pus. Operation was uneventful, and after four weeks convalescence the fistula had closed, and the patient was quite well and had left the hospital. He remained well for two weeks, when he developed pains in his legs, which became very severe, so that for almost two months, he was completely confined to his bed. This man had a very definite paralysis in both legs with Babinski's sign on both sides. During this time the bladder contained three and four plus pus in spite of active treatment. It was noted that when his paralysis had disappeared and the pain in his legs had vanished the condition in his bladder was very much improved. It is now over two years since, and he is quite well and actively engaged in business.

CASE 3

The third case was that of a man, 62 years of age, who both before and at operation had very severe hæmorrhages. A couple of weeks after his return home he developed pyelonephritis, with severe chills and fever and also pains in his legs. The pains here were not a very prominent feature but they lasted until his kidney condition had cleared. He is to-day perfectly well.

The fact that one man lived six years afterwards without any permanent damage or recurrence, and the fact that, of my earlier cases, no one has presented himself with any later symptoms, leads me to conclude that this condition occurs within six weeks. I cannot explain the underlying pathology, nor have I been able to obtain information of similar cases from other clinics. A personal communication from Dr. McCuskey, of the Mayo Clinic, states that he has had no such cases following spinal, but similar pains in the legs following sacral anæsthesia. Aside from the above events, a transitory abducens palsy is a rare event, which fortunately always clears up. Of these cases, however, there were none in my experience.

MORTALITY

We now come to the question of mortality. Before August, 1929, I had frequently had cases where the blood pressure dropped unduly and the patient's general condition was not good, yet no serious trouble arose. I was beginning to feel confident that there should be no mortality whatever from spinal anæsthesia. On visiting several clinics where spinal anæsthesia was being induced, I was struck by the fact that the blood pressure was not being frequently recorded. I was told that they never worried or bothered about the blood pressure, since ephedrine and spinocaine were being used. It happened after my return home that, for a number of consecutive cases, in checking up the blood pressure, there was very little change, with the result, I regret to say, that for a time I ceased having it done. This feeling of over confidence I see now was unjustifiable. It came as a great shock to me in August of last year when I lost a case on the table, a woman of fifty years upon whom I was performing a hysterectomy. The patient was short and stout. Soon after the operation was begun, I noticed that the blood seemed somewhat dark and remarked on it to the physician in charge. He seemed to think that she was all right, for there had been no nausea, vomiting, pallor, nor perspiration. The pulse was good and full and the colour not appreciably changed. Within a minute she stopped breathing. All efforts at resuscitation proved useless, and in another three minutes she was dead. We often learn by our mistakes, and I trust that those who are doing spinal anæsthesia will keep this case in mind, and realize the importance of the closest observation and attention to details. As a result of this mortality, I personally watch closely the rising of the anæsthesia in every case. I now consider this absolutely essential. As I said, we do not know why in some cases it takes 25 minutes and in others only four minutes for the rising of the anæsthesia. It certainly does seem that it requires less time in short people than in the tall. Do not allow the anæsthesia to rise higher than necessary for your operation. As soon as the patient is turned on her back, begin testing for anæsthesia with towel clips. When the required level is reached immediately lower the head off the table. Secondly, the blood pressure should be recorded every three or four minutes, especially during the first half hour. Also I would like to stress Babcock's injunction to keep your operating room staff on the alert for the call for intravenous therapy.

None of us care to use an unsafe anæsthestic, but, on the other hand, if we are to advance, and if we believe, as I do, that this anæsthetic is often lifesaving, it is our duty to perfect it, and also to bring before each other its dangers and its disadvantages. I feel sure that to those who are interested in spinal anæsthesia the knowledge of this last case should be helpful, and I urge again the necessity of all possible care. With the experience of Babcock, Mayo, Sise, Willinsky, Deaver, R. J. Fraser, Pitkin, and others, I feel encouraged to carry on in a careful way, because I have gathered sufficient experience in over sixteen years and in one thousand cases to feel that spinal anæsthesia plays an important rôle in surgery. I look forward to its further advances and more widespread use in the future.

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ACUTE OBSTRUCTION OF THE SMALL BOWEL*

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ALTHOUGH this paper deals primarily with the treatment and management of late cases of obstruction, I feel that the importance of early diagnosis and early release of obstruction should be emphasized, because the length of time between occurrence and release is the chief controlling factor in the mortality rate. If there is release within 12 hours, the mortality rate is less than 5 per cent; if not until the second 12 hours, it is over 12 per cent; if not until the second 24 hours, it is well over 30 per cent.

Time will not permit a detailed description of the early signs and symptoms, and I am going to leave this part of the subject with one general statement: that any patient with regularly recurring, cramping, abdominal pains, who becomes nauseated and begins to vomit dark-green or brownish fluids within 6 to 8 hours, and is not relieved with two or three large simple enemata, should not be given sedatives, and should not be allowed to suffer until the classical text-book signs and symptoms of obstruction appear, but should have an immediate laparotomy, especially if there is already a scar on the abdomen, because 50 per cent of obstructions are caused by adhesions resulting from a previous laparotomy.

The treatment of obstruction in the early stages is quite a simple matter, requiring very little pre-operative or post-operative attention, and a one-stage operation is usually possible. But, when faced with the conditions found in the late stages of obstruction, one must employ life-saving devices very often, before the patient is able to withstand radical measures.

The treatment of a late case may be considered under two headings: (1) the treatment of the toxæmia; (2) the treatment of the bowel.

Now, as never before, clinicians are realizing the necessity of close observation and application of the work of their more scientific confrères, the pathologists, the physiologists, and chemists, and no greater example can be given of the importance of this close relationship between clinician and laboratory, than the way the laboratory has so ably aided in the treatment of intestinal obstruction. Whipple pointed out the changes that occurred in the blood, and Hayden and Orr, later, made clinical application of this knowledge. They showed both by animal experimentation and by the examination of the blood of human subjects with obstruction that the first and most important change was a decrease in blood chlorides, which was soon followed by an increase in non-protein nitrogen and an increase in the CO_2 combining power of the blood, resulting in an alkalosis, which showed the dangers of the old, unscientific, custom of giving soda bicarbonate to these patients. They proved also that the blood chlorides had a very definite influence on intestinal peristalsis. Their experiments showed that peristalsis becomes less and less active with the fall in blood chlorides, until it finally stops, and no known stimulus will revive it until the depleted chlorides are restored to normal. They also showed that violent peristalsis occurs if the chloride content of the blood is raised above normal. Restoration of the chlorides to the blood became the obvious thing to do, and the clinical improvement of the patient coincided with the return of the chlorides to normal, and not before.

The chlorides can best be restored by normal or hypertonic solutions of sodium chloride, given subcutaneously, intravenously, or by the rectum. Not more than a 3 per cent solution should be given subcutaneously; as much as 12 per cent can be safely given intravenously, and this is the quickest and most satisfactory way of restoring the chlorides. Dehydration, always a marked feature of these cases, is overcome at the same time, and by adding glucose in 10 per cent solution to the saline solution, the most readily assimilated nourishment can be furnished to these patients who are always in great need of it.

The treatment of a late case of obstruction

* Read at the annual meeting of the Ontario Medical Association, Kingston, 1929.

should begin with an intravenous injection of from 500 to 1000 c.c. of 10 per cent glucose in normal, or 3 per cent saline solution before the operation, and fluids must be given after the operation, until the blood chemistry becomes normal. If a chemist is not available, a very safe guide is the condition of the patient's tongue; when the tongue becomes clean and moist, and vomiting has ceased, then it is safe to stop the artificial administration of fluids and chlorides. Fluids may be given by the continuous method with the apparatus devised by Dr. R. H. Harris, of Toronto, or by the administration of 500 to 1000 c.c. at regular intervals, from 4 to 8 hours. The stomach should be emptied before the anæsthetic is begun, because these patients often have large quantities of highly toxic fluid in the stomach, and if vomiting occurs while under the anæsthetic they may drown themselves. The anæsthetic should be of the combined type. The abdominal wall should be infiltrated and the nerves blocked with ½ per cent novocaine, together with gas and oxygen or light chloroform.

The proximal bowel in late obstruction is always found in a distended, engorged state, with feeble or absent peristalsis, and filled with highly toxic material. These loops must be emptied before the muscle tone of the bowel can resume peristalsis. There have been many devices advocated and employed to accomplish this, but a properly made and properly placed enterostomy has been found to be the most satisfactory method. This was first used in 1842 by Nélaton, and, later, advocated by Bonney in 1912, but it never became very generally used, because when done by the technique of Nélaton and Bonney it had two serious objections: (1) it very often required a second operation within a few weeks to close the fistula; (2) it allowed nourishment to escape. These two objections have been entirely overcome by the technique advocated by C. H. Mayo.

A distended loop of bowel is stripped of fluids for a few inches and rubber clamps are adjusted to keep it empty; the bowel is perforated opposite its mesentery, and a No. 10 English catheter is inserted a few inches into the lumen of the gut in a downward direction; a purse-string suture adjusts the bowel to the catheter, and the needle, passed through its side, fixes it in position. The suture may be chromicized gut or silk; if the latter, it comes out with the catheter. The catheter is depressed into the wall of the bowel, whose folds are sutured over the tube for an inch and a half, and a perforation is made in the adjacent omentum, and the catheter passed through it. The use of the omentum in this way aids in preventing leakage after removal of the catheter, and adds to the mobility of the intestine after the operation. The catheter may be brought out through the incision, in which case sutures are passed through the omentum and intestine on each side of the tube, to hold it in position, or a small perforation may be made to one side of the working incision, and sutures are adjusted beneath the opening. It is usually sufficient to leave the catheter in place from seven to twelve days.

The condition of the patient may be so serious that any surgical interference other than enterostomy is inadvisable. But if the general condition will permit, the site of the obstruction should be examined and relieved. But an enterostomy must be done whether the obstruction is removed or not, because these loops will not empty from below. An enterostomy placed in a loop close to the obstruction is of no avail. It must be placed above the obstruction in bowel that still possesses some peristaltic power.

If exploration is undertaken, it is much safer to find collapsed bowel and trace it to the obstructed area, for fear of tearing the distended semi-necrotic bowel at the site of obstruction if traction is used on distended bowel from above.

Post-operative obstruction is to be classed as one of the calamities of surgery. It may be either mechanical or paralytic, and differential diagnosis is of the utmost importance. I have found the administration of hypertonic saline of great assistance, not only in treatment but as an aid in determining whether the obstruction is mechanical or paralytic. If no mechanical obstruction be present, hypertonic solution will stimulate active peristalsis and will reduce distension by copious bowel movements; but if cramps are produced without bowel movements, then one is safe in concluding that mechanical obstruction is present. If the general condition of the patient will permit the wound should be opened and the region of the primary operation explored. Not infrequently bands of adhesions and kinks may be released at once, liberating the fluids and gases, which pass along with audible

gurgling. Enterostomy will not then be necessary. But, if the patient is *in extremis,* or if the obstruction cannot be relieved by a reasonable amount of exploration, then enterostomy must be performed. This can be done through a small wound in the left upper rectus with a local anæsthetic. One is very often pleasantly surprised to find after a few days drainage through the enterostomy, that the bowels begin moving naturally, and the much dreaded exploration is not necessary.

The response that some of these cases make to this treatment even when in the moribund stage can best be shown by a few case histories.

CASE 1

L.B., aged 22, admitted on August 29, 1927. He was in a moribund condition; the skin cold and clammy; the eyes sunken; semi-delirious; the tongue coated and parched. His pulse was 130, temperature (per rectum) 102°; blood pressure 96/60. His abdomen was markedly distended and dull in the flanks. Abdominal pains had ceased about 18 hours previously. He regurgitated about 10 oz. of dark brown fæcal smelling fluid shortly after admission. He was given 750 c.c. of 10 per cent glucose in normal saline intravenously. The stomach tube was passed and about 12 oz. of dark fluid withdrawn. The abdomen was then opened under light ether anæsthesia. A small band of adhesion was found causing the obstruction, which was easily released. No devitalization of the obstructed segment existed, but the proximal loops were enormously distended and dragged on the mesentery in a dead, lifeless manner. An enterostomy was done through a stab wound in the left rectus on a high left hypochondrium loop, and the contents of the bowel were allowed to drain into a basin. Distention was considerably reduced immediately, and closure of the abdomen was made much easier. He was given 3,000 c.c. of 10 per cent glucose in normal saline a day for two days. About one gallon per day drained through the enterostomy wound for the next three days. He began drinking water immediately after operation and did not vomit. His general condition rapidly improved, and on the 4th day he complained of abdominal cramps and had a large bowel movement with the aid of an enema. The bowels continued to move every few hours after that for 3 or 4 days. The drainage through the enterostomy opening lessened and the tube dropped out on the 7th day. There was no fæcal drainage from this wound. Both wounds were firmly healed by the 14th day. He left hospital on the 16th day and has been well ever since.

CASE 2

J.R., admitted to hospital on September 5, 1927, suffering from abdominal pains of 24 hours' duration, with nausea and vomiting which occurred 6 hours after the beginning of the pains. The tongue was coated and dry, the cheeks were flushed, and he looked septic. The temperature (per rectum) 100.4°; pulse 110. He gave a history of an attack of appendicitis one year previously, which confined him to bed for one week; otherwise his history was negative. The abdomen was moderately distended, and a considerable amount of tenderness was present all over. The point of maximum tenderness was over McBurney's point. At operation the appendix was found to be retro-cæcal and very acutely inflamed, with fibrin on its surface and firmly attached by dense adhesions. He also had adhesions about the terminal ileum, which were obstructing it in the manner of a Lane's kink. The appendix was removed and the adhesions about the terminal ileum separated. The abdomen was closed without drainage and the patient returned to bed in a fairly good condition.

The following day he was markedly distended; temperature 102.4°; pulse 128; respiration 36; restless and vomiting. Pituitrin, eserin, and enemata did not relieve the distension, and morphine would not quiet him, The following day his temperature was 103.4°; pulse 140. The patient was semi-delirious and markedly distended, and unable to retain any fluids by the mouth or rectum. The patient was given 10 per cent glucose in normal saline, 500 c.c., every 6 hours invtravenously. Distension was not relieved by the methods employed previously. The following day his condition was worse. He was very delirious and had to be restrained in bed; vomiting a small amount of dark greenish fluid. The abdomen distended and tympanitic. No benefit was obtained from ordinary measures. He was then given 500 c.c. of 6 per cent salt solution intravenously. Fifteen minutes after this he complained of severe abdominal cramps, and began expelling flatus, and had a large fluid movement which reduced his distension considerably. Five hours later, 500 c.c. of 6 per cent salt solution were given intravenously again, and gas and a large fluid movement resulted immediately following the treatment. The bowels continued to move from eight to ten times a day for the next two days, and he made a rapid recovery from then on.

CASE 3

W.S., aged 31, admitted on January 25, 1928, in a moribund, cold, clammy condition. Temperature 103°; pulse 130. The tongue was dry and coated, white blood cells were 35,000 per c.mm. Vomiting of dark brownish fæcal-smelling fluid. The abdomen was markedly distended, and extremely tender and dull across the lower zone. The patient had been ill for twenty-two days with pelvic appendicitis, and three days previous to admission intestinal obstruction had commenced.

The stomach was lavaged, and 500 c.c. of 10 per cent glucose in normal saline, and 500 c.c. of 6 per cent saline were given intravenously. Fifteen minutes later, while the patient was being put on the operating table, he was seized with violent cramps, the first he had had for eight hours, and he had a copious bowel movement which reduced his distension slightly.

A diffuse purulent peritonitis was found, extending well above the umbilicus. The pelvis was filled with pus and a gangrenous appendix was felt on the right side; a fæcolith was removed, but no attempt was made to remove the appendix. The aspirator was used to remove all free pus. Several loops of small bowel were adherent near the brim of the pelvis and were easily released, but no attempt was made to free those adherent in the pelvis. "Ileus duplex," described by Sampson Handley, was present. Penrose drains were inserted and an enterostomy was done through a stab wound in the left upper rectus. The lower wound was closed around the drains.

The lower wound drained pus freely. The drains were all removed by the tenth day; drainage through the enterostomy tube was free. There was no post-operative vomiting. Two thousand five hundred c.c. of 10 per cent glucose in normal saline were given daily for three days, also 1,200 c.c. of 6 per cent saline. After each administration of 6 per cent saline violent cramps would occur and gas and fluid would be forcibly expelled from the enterostomy tube. On the eighth day the bowels began moving normally, and drainage from the enterostomy wound ceased on the 12th day. The tube dropped out and the wound healed without any drainage. The patient was up on the 16th day, left hospital on the 21st day, and has continued to improve ever since.

CASE 4

J.B., male, aged 21, admitted on June 6, 1926, with severe abdominal pain and vomiting which began twelve hours previously. His temperature was 100.3°; pulse 120. His cheeks were flushed, the tongue coated and dry, and he looked toxic. Board-like rigidity was present in the abdomen.

The appendix was gangrenous, retrocæcal and firmly adherent with dense adhesions; about ¾ of an inch from the base. Pus and fæcal contents were exuding from the point of rupture. There was evidence of a virulent, spreading peritonitis. The appendix was removed and the abdomen drained.

The day following operation the patient was moderately distended and looked toxic. Enemata with pituitrin and eserin did not relieve the distension. He was restless and morphine did not give relief. On the 2nd day after operation he was markedly distended, more restless, and obtaining no relief from enemata. He began to regurgitate dark green fluid in large quantities. Gastric lavage was begun and repeated every four hours with great relief. On the 3rd day the patient was worse in every way. It was impossible to relieve the distension. He was becoming cold and cyanotic, and appeared to be dying. The use of the stomach tube became more frequent and the duodenal tube was passed and allowed to remain in stomach permanently. This gave great comfort; about a gallon per day drained through this tube. I had just read Dr. J. W. Ross's experience with hypertonic saline and decided to use it. This patient had been given 1,500 c.c. of 10 per cent glucose in normal saline every day since operation. I then gave 500 c.c. of 12 per cent salt solution intravenously; when about 400 c.c. had run he began to squirm and complain of abdominal cramps. These were the first abdominal cramps he had had since the operation. Boroborygmi was also heard, and before the nurse could get the pan he began expelling gas and had an enormous fluid movement. This 12 per cent solution was repeated every four hours for three doses, and a similar result followed each treatment. He rapidly improved, and on the 9th day the bowels were moving freely and he was out of danger. He made an excellent recovery.

DISCUSSION

DR. ROSCOE R. GRAHAM (Toronto), I should like to emphasize the need of recognizing small bowel obstruction in its early stages. Our personal statistics show a mortality of 35 per cent in all cases of acute intestinal obstruction, and while this on the surface is a terrible admission, it unfortunately is not worse than the record of any large hospital. As teachers, we are probably responsible for this, because, during our recent examinations, we asked repeatedly for a description of a patient suffering from obstruction of the small bowel of six hours' duration, and were repeatedly told that the patient would be collapsed, with a rapid, thready pulse, subnormal temperature, clammy skin, marked pallor and anxious face. I cannot too strongly emphasize the fact that a patient with even a twelve hours' obstruction looks well and feels well between the paroxysms of crampy pain. The temperature and pulse are normal; there is no pallor, and the skin is not moist. Therefore, when a patient is suffering from rhythmical, crampy pains, associated with nausea, unrelieved by enemata, Dr. Stobie's point is well taken that sedatives should not be given, and even if, through misjudgment, one does give sedatives, they will not relieve and further support is given to the possibility of a small bowel obstruction.

The recent experimental work showing the fallacy of the former conception, that repeated vomiting in cases of intestinal obstruction results in acidosis, has been of the greatest clinical value. Rather, has there been produced an alkalosis, as has been so amply demonstrated in the cases reported.

I must take issue with Dr. Stobie on one point, namely, giving hypertonic salt solution subcutaneously. Our experience has been that the subcutaneous introduction of hypertonic salt solution is deleterious, insofar as it calls forth from the circulating fluids further chlorides, in order to render the interstitial fluid isotonic before it can be absorbed. I should like to stress the importance of giving intravenously enormous quantities of fluid with a high percentage of sodium chloride, even up to 10 or 12 per cent.

Experimental work has also shown us that it is perfectly futile to put in the requisite amount of chloride, unless the dehydration is corrected, because these two conditions go hand in hand, and to correct one without the other will not produce the desired clinical effect. We had this brought home to us in a most striking manner in a patient recently who was given five litres of fluid and put out through a duodenal tube over nine litres of fluid in 24 hours. That is, we gave 12.5 lbs. of fluid and he put out 22.5 lbs. This may seem a fairy tale, nevertheless it is true. You will also note that, despite the fact that we put in five litres of fluid, he lost four litres more than we put in. On the following day we put in seven litres and he put out five and a half litres. On the fourth day he put out seven and three-quarters litres and a similar amount was put in. That is, in 24 hours, 58 pounds of fluid was exchanged. On subsequent days his bowels started to move and he absorbed his fluids, and he had for the next few days an intake of about 3,000 c.c. in 24 hours. But in four days he put out approximately 38 litres of fluid, and by using all the means available we were only able to put in 23.5 litres, showing that he had an output in excess of his intake of 14 litres. Where did this fluid come from? While the man wasted to a shadow before our eyes, he still was able to maintain his metabolism, and finally recovered. This was the most startling example we have had of the necessity of pushing enormous quantities of fluid. Under certain conditions we have, even with large quantities of fluid, been unable to maintain a normal chloride content of the blood, but by adding ammonium chloride per rectum to our regime we have been able to accomplish this. We are now giving 180 grains of ammonium chloride in two oz. of warm liquid paraffin every four hours per rectum.

One hears a great deal about post-operative ileus, which is supposed to be adynamic in character, that is, not due to any mechanical obstruction, probably from plastic exudate at the seat of a suppurative area around the former operation wound. It is in this type of case that a high jejunostomy, done under local anæsthesia after the Witzel method of implanting the tube, is of such inestimable advantage, and in no instance after using the technique described by Dr. Stobie have we had a jejunal fistula. We like to use a rubber tube about the size of a No. 10 catheter, rather than a catheter, for the reason that the lumen of a catheter is of necessity less than a rubber tube of the same size, as the latter does not need the rigid quality of a catheter.

In cases of Cæsarean section, and in large ovarian cysts or other large abdominal tumours, where there has been a sudden release of intraperitoneal tension, adynamic ileus is a more real possibility, and in this type of case we can commend to you the method of spinal anæsthesia as described by Markowitz and Campbell[1] last year. This consists in giving a spinal anæsthetic at a higher level than normal, using 4 c.c. of 4 per cent novocain between the 11th and 12th vertebræ. This causes a terrifying fall in blood pressure, but in the few cases in which we have used it, there have been no fatalities, and recently Dr. B. P. Watson has reported eight cases in which he felt that there were most admirable results.

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THE FUNCTIONAL BASIS OF THE MORE COMMON GASTRIC SYMPTOMS*

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ON the correct interpretation of symptoms depends in great part the diagnosis of gastric and intestinal disorders. It therefore becomes of great importance to search for the causes of these symptoms, which are always associated with disturbances of physiological processes. Since the normal physiology is but partly understood there are obvious difficulties in the path of the investigator; nevertheless, considerable progress has been made, and never more rapid progress than at the present time. Doubtless, many of our provisionally accepted explanations will have to be modified by the results of further investigation.

HUNGER, APPETITE, ANOREXIA AND NAUSEA

Hunger and appetite are normal sensations, and cannot ordinarily be regarded as symptoms of disease. They are here considered because of their relation to the symptoms of anorexia and nausea. Hunger is nearly always confused with appetite, and it is often extremely difficult for a patient, or even a physician, to separate them. Indeed, in clinical work there is often little to be gained by such a distinction. Perhaps the simplest method is given by Ryle,[1] who says that appetite is a pleasant sensation, whereas hunger is unpleasant. It may be added that hunger is a much rarer sensation than appetite, and that most of us seldom experience what the novelists used to term the "pangs" of hunger.

It has been clearly demonstrated by Carlson and others that hunger is associated with increased muscular activity of the empty stomach, either as deep peristaltic waves or as tetanic contractions. The more painful the sensation experienced, the stronger are the gastric contractions. If a really hungry man be given a barium meal, the true hunger contractions will cease, but the peristaltic waves will be deep and continuous, and will empty the stomach rapidly. Although the man will now not feel the periodic pains of hunger, his sense of appetite will be retained. Thus appetite is associated with active peristalsis and rapid evacuation of the stomach. If, on the other hand, the patient suffers from anorexia, the peristaltic waves are shallow or absent, and the stomach will empty more slowly. If he complains of nausea, the pyloric part of the stomach contracts as a whole, and peristalsis ceases in the rest of the organ.

Thus we see that, in the absence of organic lesions, the sensations of hunger, appetite, anorexia and nausea are associated with definite conditions of the stomach muscle. Similarly, in carcinoma of the stomach and in other diseases involving structural changes in the gastric wall, anorexia and nausea are very frequently experienced. But are we justified in assuming that these sensations are dependent on muscle conditions? There are many observations which suggest that such may not be the case. For instance, Bennett and Venables[2] hypnotized healthy young men, and suggested to them the sensation of hunger. The stomach emptied quickly. When nausea was suggested, the emptying was delayed. Here the stomach conditions were clearly not the primary ones, but were secondary to the mental states. Again, when persons in perfect health encounter disgusting sights or smells the result is frequently anorexia, nausea, or even vomiting. Similar phenomena occur in seasickness. In these cases also the causative factors are evidently outside the stomach. In some instances of gastric carcinoma it is notorious that the patient retains his "appetite" although there is very extensive destruction of the stomach muscle. Equally striking are recent reports of patients continuing to feel hunger after total gastrectomy.[3]

Thus we find that, although the sensations of hunger, appetite, anorexia and nausea are almost always associated with definite conditions in the stomach muscle, it is difficult to see how any causal relationship can exist. And yet so logical would such a relationship be, and so

* Read at the annual meeting of the Ontario Medical Association, Toronto, May, 1930.

much in harmony with our knowledge of the causes of other symptoms, that these apparent exceptions are being examined again with greater care. In patients who retain hunger and appetite, despite gastrectomy or extensive carcinomatous involvement, it is quite possible that the sensations are due to vigorous contractions of the small bowel, which were noted by Rossbach[4] and others many years ago as associated with hunger. And if it should be found that mental states can alter conditions in the stomach muscle, and that these conditions can affect consciousness again, as sensations of hunger, anorexia, nausea, and so forth, many of our objections to such a causal relationship will disappear.

VOMITING

The actual process of vomiting, as seen in two hospital internes who volunteered their services, is as follows: When a healthy man puts his finger in his throat after a barium meal, the peristaltic waves cease and the pyloric end of the stomach contracts as a whole, squeezing the contents into the vertical portion, which lies as inert as a bag of flour. If the subject continues to tickle his throat, the abdominal muscles contract, the diaphragm descends sharply, and gastric contents are forced through the cardia and into the mouth.

The causes of vomiting are many, and may be local, reflex or cerebral. Vomiting may still occur if the vagus nerves are cut, or even if the whole stomach has been removed. Indeed, Magendie[5] removed a dog's stomach and replaced it by a pig's bladder and found that vomiting could still take place. Anyone who wishes to pursue the subject further is referred to the work of Hatcher[6].

HEARTBURN

Heartburn is a very common symptom in health and in disease. It occurs usually within two or three hours of taking food or drink, and its occurrence is frequently attributed to the ingestion of some substance, such as tomato soup, pickles or aspirin. Now these substances are acid in nature, and it is significant that heartburn is almost never complained of by persons without free acid in the stomach contents. Many years ago Reichmann[7] found that the œsophageal contents were acid in men complaining of heartburn, and alkaline in all others. For some years in a large hospital ward I passed a stomach tube on every patient complaining of heartburn, withdrew some gastric contents, and then injected a few c.c. of this into the œsophagus. Heartburn was nearly always experienced afresh. The injection of hydrochloric acid of similar strength and temperature had no such effect. The subsequent injection of more of the gastric contents again excited the sensation. Evidently there is some substance in the gastric contents capable of producing heartburn, and that substance is not hydrochloric acid.

Payne and Poulton[8] placed small balloons in the œsophagus and recorded the changes in pressure. They found that the sensation of heartburn was accompanied by contractions of the lower œsophagus. Here, in Toronto, we have tried to confirm this observation by attempting to induce heartburn in normal men under the x-ray screen. It is unfortunate that we could never produce the sensation when desired. The probability is that heartburn is a sensation produced by contraction of the lower œsophagus, and that this contraction is caused by some acid or some product of acid digestion regurgitated from the stomach. It has no clinical significance, except perhaps to suggest that the subject has acid in his gastric secretion.

BELCHING

The belching of gas after meals is a normal process in all individuals, as it is the normal means of getting rid of the air which is swallowed with the food. The amount of air swallowed is small when the food is thoroughly masticated, and larger when the meal is eaten hastily. In some European and Asiatic countries, I am told, a dinner guest is not considered polite unless he belches noisily to show his appreciation of the food.

The bringing up of larger quantities of gas is very seldom due to abnormal gas formation in the stomach or elsewhere. Analyses of such gas show it to be atmospheric air, with perhaps the addition of carbon dioxide and the removal of some oxygen. The usual cause of copious belching is the nervous trick of air-swallowing which is found in many neurotic patients. It can sometimes be cured by simply telling the patient to

stop, as in a case described by Alexander McPhedran.

There is another large group of patients who complain of "gas in the stomach", and who often try unsuccessfully to belch to get relief. Some of them have definite organic lesions, such as chronic appendicitis or cholecystitis, but in many no lesions can be found. It has been supposed that the pressure in the stomach in such cases is raised above the normal levels, and that the expulsion of air momentarily lowers the pressure and thus gives relief. Careful measurements of pressure in the stomachs of such patients and of many normal men are now being made, to get direct evidence on this point. Thus far no appreciable difference has been found in the pressures in patients and controls, and, further, the belching of gas does not lower the pressure below the average level.

If the general intra-gastric pressure is not raised in these patients, it is possible that there may be increased muscle tension in some localized regions of the stomach. Many radiologists have seen a spastic condition of the whole pyloric portion of the stomach in cases of gall-bladder disease, and this could probably occur without appreciably affecting the general stomach pressure. Barclay[9] has seen pyloric spasm cured by the removal of infected teeth. It is not unlikely that such localized muscle contractions are the cause of much distress in the digestive tract.

DISCOMFORT

Discomfort after a meal is often associated with increased motility, or gastro-intestinal "hurry". Lehman and Gibson[10] made a jejunal fistula in an injured man, and found some difficulty in feeding him. If he ate fresh bread, it appeared at the fistula in doughy masses, which increased the motility of the bowel. Dry bread, on the other hand, appeared as smaller lumps of more friable material, and the intestinal activity was much less. This observation suggests, I think, one of the common causes of discomfort following a meal, and the reason why many of these patients are improved by a dry diet.

"Hurry" is frequently the result of emotional strain or of too intense application to work, and is common in business men and especially in students at examination time. The effect is increased if meals be eaten hastily, or if too much tea and coffee be consumed. In extreme cases such patients present many of the symptoms of duodenal ulcer. There is rapid emptying of the stomach, and usually some spasm of the first part of the duodenum. Many of you will remember a consultant physician who was convinced he had a duodenal ulcer, as he had characteristic symptoms, including periodic attacks of pain two hours after meals, with relief on taking soda. However, if he went away on a holiday his symptoms completely disappeared in two or three hours, and did not recur until he returned. On his untimely death the post-mortem examination showed no sign of ulcer. Patients who suffer from this condition gain great relief from adequate rest and relaxation, and especially from frequent small feedings of non-stimulating foods.

PAIN

Actual pain in the gastro-intestinal tract may be in relation to any one of four conditions. In peritonitis the pain is constant in character. Pain which changes with posture is due to inflamed lymph glands or mesenteric attachments. Occasionally, pain is found in swelling of a solid organ, such as the liver, and here it is dull and constant. In the majority of instances, however, pain is associated with over-contraction of some smooth muscle fibres of the tract. In early appendicitis pain is associated with over-contraction of the muscle in the appendix. In many cases the pain is first felt in the epigastrium, and there is evidence that this is accompanied by spasm of the first part of the duodenum. In gall-stone colic, or simple intestinal colic, there is again over-contraction of muscle. In gastric and duodenal ulcer the pain is not due to the friction of food or the irritation of acid, but is associated with increased muscular tension amounting to spasm. Even in the gastric crises of tabes dorsalis there is hyperactivity of the muscle, according to Symonds.[11] So constant is the association of over-contraction of muscle with pain, that it is probable that the contraction is the cause of pain. The contraction, however, must be of considerable intensity in order to be interpreted by the patient as pain. Sustained contraction of the pyloric sphincter, so frequently seen on the fluorescent screen after a barium meal, is not usually apparent to the pa-

tient, although I know one man who can often tell when his pyloric sphincter is contracted or relaxed. Those of you who have watched patients with seemingly organized hour-glass stomachs in the x-ray room, when no pain was being felt, and then have observed them at operation, will have been amazed at the amount of relaxation under anæsthesia.

The more common gastro-intestinal symptoms, therefore, are associated with changes in the activities of the muscle of the œsophagus, stomach, and intestines. A causal relationship between muscle activities and symptoms appears logical, but at present can be accepted only as a working hypothesis, which can be stated as follows: The basis of nearly all gastro-intestinal symptoms is a disturbance in function of the smooth muscle of the tract.

There are many problems which must be solved before all these symptoms can be interpreted correctly, but a great advance in the symptomatology and treatment of gastro- intestinal diseases will come from a more intensive study of smooth muscle and the factors which influence its activities.

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THE ADMINISTRATION OF GASTRIC ANTACIDS

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AN examination of the literature on this subject reveals the fact that sodium bicarbonate is now much less favoured than it was some years ago. This is largely due to the teaching of Hurst,[1] Loevenhart[2] and MacLean.[3]

If excess amounts of sodium bicarbonate or of magnesium oxide be added to a hydrochloric acid solution of the strength of gastric juice (0.3 per cent), the solution becomes alkaline within one minute; but, as Crohn has shown by the examination of gastric contents, the alkalinity produced by sodium bicarbonate and magnesium oxide lead in turn to a fresh secretion of gastric juice. He found a greater production of gastric juice with the bicarbonate than with the oxide. With the latter there is no production of gas. Magnesium and calcium carbonates will lead to the gastric juice becoming neutral quickly.

If sodium citrate is added to such a solution of hydrochloric acid, the mixture will give an acid reaction with certain indicators and a neutral reaction with others. One would expect to find in such a mixture sodium chloride, some sodium citrate, citric acid, and a trace of hydrochloric acid. Apparently it would contain as much acid as the original hydrochloric acid, and by titrating the mixture with sodium hydroxide solution and a suitable indicator, this would be the result obtained. But to-day, acidity is judged rather by the amount of free hydrogen-ion present, and by this standard the mixture will have a neutral reaction which is expressed as pH. 7.0. The original hydrochloric acid solution would be very acid (pH. 1.0). This is due to the fact that the citric acid in such a solution largely exists as citric acid and liberates very few hydrogen-ions, while in such a hydrochloric acid solution almost all the hydrogen-ions are free. The same type of reaction occurs with potassium citrate, or any acetate. If tribasic calcium and magnesium phosphates are added to an artificial gastric juice the mixture becomes neutral (pH. 7) in a minute and stays neutral. Calcium carbonate brings about neutrality more

slowly, but the mixture does not become alkaline (*i.e.*, does not attain a pH. of more than 7.0). Bismuth carbonate only reduces the acidity (to pH. 4.0). By weight, magnesium oxide is the most efficient neutralizer. About four times as much sodium bicarbonate, and five times as much of the citrates or tribasic phosphates are required.

Hurst uses and recommends the tribasic phosphates, using the magnesium in cases that tend to become constipated. These salts are not in the Pharmacopœia, and we have not experimented with them.

Loevenhart and Crandall condemn sodium bicarbonate, as they find the relief of pain in gastric ulcer is but temporary, and in the strengths of solution commonly employed or in powder it is somewhat irritating. It is readily soluble, hence if too much is given, a fresh secretion of acid is produced, and if pushed, it may produce an alkalosis and an unduly alkaline urine. Magnesium oxide and carbonate are insoluble. The part that is not used to neutralize the acid is not dissolved; both have a laxative action. Hence they regard calcium carbonate as the best neutralizer. This is insoluble save in the presence of acid; it does not affect the movements of the bowel, nor disturb the acid base equilibrium of the body. Bismuth subnitrate and carbonate may best be regarded as acting largely as inert dusting powders lodging on and protecting the ulcer.

℞ Sodii Bicarbonatis ℥ ss
Magnesii Carbonatis Ponderosi
Calcii Carbonatis ana ℥ i
Bismuthi Carbonatis ℥ ii
Dose—a small teaspoonful.
A level teaspoonful weighs about 38 gr.

Sodium bicarbonate is, however, still employed, and in a powder mixture, such as that suggested by MacLean, which precedes this paragraph, when not enough of the bicarbonate is taken at a time to neutralize all the acid present, it has the effect of acting more promptly than the two carbonates associated with it would do alone; while these slower acting bases complete the process of bringing the gastric contents to neutrality without making the juice alkaline. A teaspoonful of this powder would seem to provide a great excess of alkali if the figure, 0.375 gm. hydrochloric acid, given by Loevenhart and Crandall as the maximum amount of acid in hypersecretion, is correct.

The citrates, when given in solution, act quickly. They prevent the curdling of milk which MacLean and Hurst regard as an advantage.

We have studied the various official preparations, and are prepared to recommend the following:—

℞ Olei Menthæ Piperitæ min. ii
Magnesiæ Carbonatis Levis ʒ ii
Calcii Carbonatis ad ℥ i
Weight of a level teaspoonful about 18 gr.

℞ Olei Menthæ Piperitæ min. ii
Magnesii Carbonatis Ponderosi
Calcii Carbonatis āā ʒ iii
Sodii Bicarbonatis ʒ ii
Weight of a level teaspoonful about 30 gr. If made with the light carbonate, about 15 gr.

The powder recommended by MacLean is improved by the addition of a volatile oil, *e.g.*, that of peppermint (1 to 2 min. to 1 oz.). It would be less laxative than the first of these two.

In mixtures it has been found that the pharmacopœial substances differ greatly in their effect on flavours. Magnesium oxide is best covered by cinnamon water or syrup of ginger. The light magnesium carbonate is not unpalatable with anise or cinnamon water, but if potassium citrate be present, anise water makes a very unpleasant vehicle. The heavy carbonate is adequately covered by the compound tincture of cardamoms, as is calcium carbonate. Hence, we would recommend the following mixtures. The addition of a mucilage not only aids in suspending the powder, but also improves the flavour.

℞ Potassii Citratis gr. xl
Calcii Carbonatis gr. xx
Tr. Cardamomi Co. min. xx
Syrupi ʒ i
Mucilaginis Tragacanthæ ad ℥ ss
Dose—2 to 3 or 4 fl. dr.

This mixture should have no laxative effect, while the next two will be slightly laxative.

℞ Potassii Citratis gr. xl
Magnesiæ Carbonatis Levis gr. x
Tr. Cinnamomi min. xx
Syrupi ʒ i
Mucilaginis Tragacanthæ ad ℥ ss
Syrup of Ginger, min. xx, can be used in place of the tincture and syrup.
Dose—2 to 4 dr.

℞	Potassii Citratis	gr. xl
	Magnesii Carbonatis Pond.	gr. xx
	Tr. Cardamomi Co.	min. xx
	Syrupi	ʒ i
	Mucilaginis Tragacanthæ	ad ʒ ss

Dose—2 to 3 or 4 dr.

Potassium citrate alone, 10 gr. in a drachm, is best covered by 5 to 7 minims of compound tincture of cardamoms and twenty minims of syrup, or by twenty minims of syrup of ginger, or by tincture of cinnamon and syrup.

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OBSERVATIONS ON THE DIAGNOSIS AND TREATMENT OF RENAL CALCULI*

BY GORDON S. FOULDS, M.B., M.S.,

Toronto

A REVIEW of 45 cases of renal calculus treated on the Urological Service at St. Michael's Hospital emphasizes three problems relative to diagnosis and treatment of renal lithiasis:— first, the amount of destruction that occurs in the kidney as the result of the presence of the stone; secondly, the frequency with which renal calculi go unrecognized over long periods of time; and, thirdly, the number of cases met with that have had previous operations for the relief of symptoms which in many instances are related to the presence of stone in the kidney.

Chute[2] has repeatedly drawn attention to the extensive and insidious damage resulting from calculi in the urinary tract, and also, how unsatisfactory treatment of the condition has been. In a review of 50 cases he found it necessary to remove stone-bearing kidneys six times, because of extensive destruction, while in a seventh case the kidney was wholly destroyed, but was not removed because of the patient's poor condition. In addition to these 7 cases, 12 more were shown by pyelograms to have considerable destruction of renal tissue, with very marked impairment of function. This makes a total of 19 cases in which destruction or very severe impairment occurred in the kidney as the result of the presence of calculus, approximately 40 per cent.

At the Mayo Clinic,[4] from January 1, 1922, to October 1, 1929, operations were performed for surgical lesions of the kidney 2,185 times. In 1,044 (42 per cent) of these cases, the operation was for stone; in 363 the operation was nephrectomy, and in 692 it was for removal of the stone only. In the 45 cases which were reviewed for the purpose of this paper, nephrectomy was performed in 18, or 40 per cent. A diagnosis of definite calculous pyonephrosis was made 17 times. Consideration of these facts leaves little doubt as to the correctness of the statement made by Chute, "that a renal calculus, if allowed to remain, means ultimate destruction of the kidney harbouring it."

The second observation to which I have referred is very closely related to the first, for I believe that one of the main reasons that calculi are allowed to remain in the kidney until such destruction is apparent is that their presence in many instances is quite unsuspected. In other cases, however, I fear we must admit that the seriousness of neglecting nephrolithiasis is not fully appreciated, either by the patient or his physician. Before the advent of the roentgen ray, physicians relied entirely on the history presented by the patient, in making a diagnosis of renal lithiasis. The history elicited in almost every case was that of severe pain occurring in the loin, radiating along the ureter and down into the external genitalia, which we have come to speak of as renal colic. This pain, associated with red blood cells in the urine, made the usual clinical picture. With this definite picture so well established, it appears to be difficult for many to realize that it is not present in every case, and that stone is frequently present with few or no typical symptoms. The pathologist was the first to demon-

* Read before the Section of Surgery, Academy of Medicine, Toronto, April 18, 1930.

strate this, for while making post-mortem examinations it was not an uncommon occurrence for him to find stones in the kidneys of persons dying from some other condition. Many of these patients had never given any history suggestive of lithiasis. Such stones were known as "silent" calculi.

With the increased employment of the roentgen ray, and the improvement in the x-ray technique, more and more silent calculi have been discovered. It now becomes apparent that, with symptoms in so many cases falling far short of the traditional picture, and physical examination revealing very little in many instances, final diagnosis frequently must rest on x-ray examination, supplemented by cystoscopic investigation. This combined procedure will demonstrate the presence of stone in almost every instance.

Why is it that many calculi go unrecognized for long periods of time? I think this is due to the fact that we are looking for a typical history of renal colic, associated with hæmaturia, before suspecting the presence of a stone, and before considering a roentgen ray examination of the urinary tract. Truly, a very large proportion of patients suffering from stone do give a very suggestive history, but this is no reason for overlooking many of the less typical cases.

CASE 1

A case of this sort was Mr. H.M., aged 31, who was referred to me on account of pyuria. Attention was attracted to the presence of pyuria in 1918, during treatment at a prophylactic station in France. No venereal disease was contracted, but from this time on pus was present in the urine. One year later, and again in two years, a mild left epididymitis occurred. These attacks increased suspicion of latent gonorrhœa. A few years later an incomplete cystoscopic examination was made, with negative findings. No x-ray films were made at this time. During 1928, and later in the summer of 1929, attacks of unexplained malaise with chills and fever were experienced. On admission the physical examination was negative, except for marked pallor. Severe secondary anæmia was shown by a red blood cell count of 2,155,000, with hæmoglobin of 32 per cent. A well marked reduction in renal function was demonstrated by high nitrogen retention in the blood, the blood urea nitrogen being 62.4 milligrams and non-protein nitrogen 93.5 milligrams for each 100 c.c. of blood, and a phenolsuphonephthalein secretion of 10.4 per cent in two hours. The water test gave a fixed specific gravity with only four points variation after ingestion of 1,500 c.c. of water. A urine examination showed a specific gravity of 1012, the presence of a moderate amount of albumin and no sugar. Microscopic examination of the urine showed 200 to 300 pus cells per high power field.

Roentgenogram of the urinary tract (Fig. 1) showed extensive bilateral calculi, together with stones in the prostate, these latter probably accounting for the occurrence of the epididymitis.

FIG. 1.—Plain x-ray of H.M., showing extensive bilateral stone formation.

CASE 2

A somewhat similar case was that of Miss S.M., aged 21, who had had no symptoms referable to the urinary tract up to two weeks before entering hospital, when she developed vague right-sided abdominal pain, which extended back into the loin. Renal function was markedly reduced. Cystoscopic examination and x-ray films (Fig. 2) revealed bilateral renal lithiasis with advanced infection in each kidney.

FIG. 2.—S.M., with ureteral catheters in place. Plain x-ray of urinary tract. Multiple stones in each kidney.

These cases demonstrate how renal calculi may exist and increase in size until most advanced renal destruction has taken place, without revealing their presence by pain or symptoms referable to the upper urinary tract. Other patients, though without localizing symptoms, may be fortunate enough to present symptoms, which call for immediate investigation.

CASE 3

Such a patient was E.H., a young man, 30 years of age, who came to me complaining of hæmaturia, which occurred suddenly two months previously and lasted only for a few days. He had been put to bed and given some medicine while the hæmaturia cleared up. He returned to his home in Toronto for further convalescence. The urine was now clear, but as he commenced to take more exercise he noticed that after a day's exertion, on one or two occasions there was blood in the urine. No pain or frequency of urination was noted. X-ray of the urinary tract showed a small shadow about 7 x 5 millimetres located in the region of the right kidney (Fig. 3). This was proved by cystoscopic examination to be a stone in the pelvis of the kidney and was removed by a pelvilithotomy.

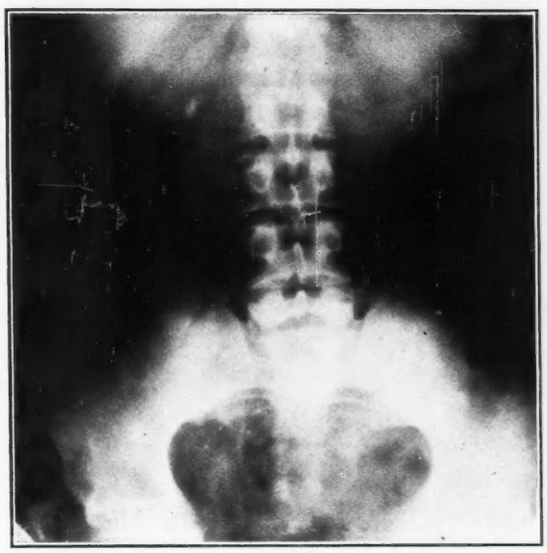

FIG. 3.—E.H., plate of urinary tract. Shadow in right renal area.

Renal colic when present may be produced by many different conditions, both within, and, less commonly, without the urinary tract. Confusion may result however when colic occurs associated with suspicious shadows in the x-ray films.

FIG. 4.—E.T., shadow in left renal and ureteral area.

CASE 4

Such a difficulty was experienced when a young man, Mr. E.T., was referred to me because of definite left-sided renal colic, which had occurred a few days previously and had been associated with microscopic hæmaturia. Physical examination was negative. Microscopic examination of the urine showed the presence of red blood cells. X-ray films made of the urinary tract showed a group of shadows in the renal area and a small shadow lying in the line of the left ureter opposite the fourth lumbar vertebra (Fig. 4). Though all shadows were reported, there was some doubt, both in my mind and that of the roentgenologist, as to the nature of the smaller shadow. Cystoscopy was arranged for but postponed for a few days. In the meantime, after further renal colic a small stone was passed, which corresponded

FIG. 5.—Same patient as Fig. 4. Ureteral stone passed. Upper shadow proved to be extra pelvic.

FIG. 6.—Mrs. B.R. Pyelogram showing hydronephrosis, accounting for pain, and extra-renal shadow cast by tuberculous lymph gland.

to the smaller shadow in the line of the ureter. Additional x-ray plates showed this shadow to have disappeared. Cystoscopic examination with pyelogram (Fig. 5) was subsequently made, and the shadows in the renal area proved to be extra-renal in nature, and, apparently, calcified lymph glands.

CASE 5

A somewhat similar case was that of Mrs. B.R., who after a left-sided renal colic of moderate severity had an x-ray examination made. Several shadows were reported in the left side of the abdomen, which associated with the pain she had suffered, were thought to be urinary calculi. She was referred to me for further examination, which revealed a moderate left-sided hydronephrosis that accounted for her pain, the shadows being definitely extra-urinary and again calcified glands (Fig. 6).

In a review of the case-histories of patients who had had renal lithiasis, I was surprised to find that a large number had had operations of various sorts for the relief of symptoms which in many instances appeared to have been due to calculi. The commonest operation found was appendectomy. In a previous series which I reviewed, more than one-quarter of the patients had had this operation performed. It seemed to me that this was a very large percentage. Consequently, I went over these case histories again and found that in 73 per cent of those cases which had had the appendix removed, the condition was associated with right-sided stones. In other words, more than twice as many appendices were removed in patients with right-sided stone as compared with those harbouring a left-sided stone.

In many instances, the diagnosis between the two conditions may be rather difficult, and, if an error has to be made, doubtless it is better to err in removing a relatively normal appendix and leaving a stone in the kidney, than to wait a complete investigation to rule out stone in an acute appendix case. However, one doubts if in the majority of these cases the symptoms were acute at the time of operation.

CASE 6

Recently, a young man, 31 years of age, was referred to me because of pain in the lower right abdomen, which had recurred at intervals over a period of fourteen months. The pain had never been severe and had lasted for a day or two at a time. It was often accompanied by nausea at its onset. Investigation carried out previously was considered to justify a diagnosis of chronic or sub-acute appendicitis and operation had been advised. However, on receipt of this advice the patient mentioned, what he had neglected to recall before, that after one of the early attacks of discomfort he had noticed that his urine was highly coloured and possibly blood-tinged. Consequently, he was referred to me for urological investigation. Physical examination showed very little. X-ray examination of the urinary tract showed a small shadow in the right renal area which was proved by pyelogram to be a small calculus (Fig. 7).

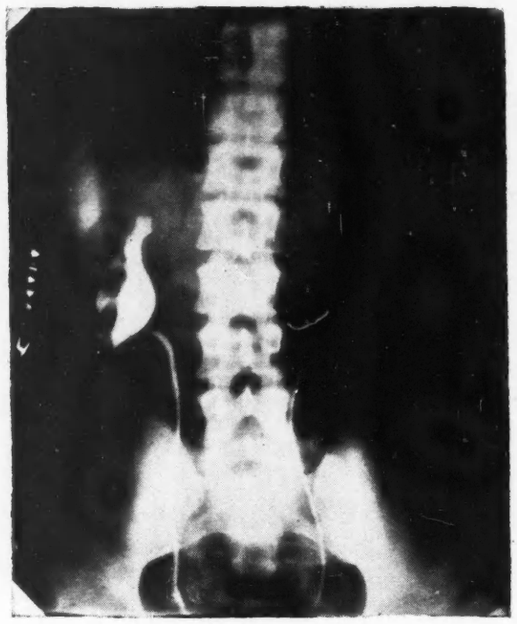

FIG. 7.—A small right renal calculus showed, obscured by right pyelogram.

Chute found that 15 per cent of his cases showed a preponderance of gastric symptoms, though all of these had experienced at some time pain in the loin or back, in addition to their gastric complaints. In the larger series of cases which I reviewed previously I found that one in twenty had been operated upon for gall stones, and that several others had been subjected to abdominal exploratory operations.

TREATMENT

The present treatment of renal calculi is obviously far from satisfactory and a far greater proportion of conservative operations should be possible. In a previous communication[1] I laid down the following indications for nephrectomy: (a) when the kidney is functionless or nearly so; (b) in the presence of secondary malignancy; (c) when there is diffuse advanced infection; (d) in the presence of marked hydronephrosis; (e) when there has been a previous operation on the kidney with or without fistula. Even with these indications in mind, and restricting nephrectomy to those cases which come within the limits of these indications, the present series of cases shows no fewer nephrectomies than the first series, both being about 40 per cent. It is obvious, there-

fore, that if we are to reduce the number of nephrectomies, as compared with conservative operations, we must see cases of renal lithiasis much earlier than at present.

CONCLUSIONS

1. If a larger proportion of conservative operations is to be possible, diagnosis must be made earlier.

2. To accomplish this, renal calculus must be looked for in patients other than those presenting the classical clinical picture of renal colic, so that earlier and more frequent x-ray examination will be made.

3. When renal calculi are discovered, their presence must be considered to be a definite menace to the kidney harbouring them.

4. Early operation should be undertaken as soon as possible after discovery of the stone, in the vast majority of cases, and in those cases where for any reason operation is postponed the patient should be kept under very close observation.

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THE KIRSCHNER METHOD OF SKELETAL TRACTION IN THE TREATMENT OF FRACTURES*

BY R. R. FITZGERALD, M.D.,

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THERE are three stages in the treatment of fractures of the long bones; first, reduction, or accurate replacement of the fragments; second, fixation of the reduced fracture; third, restoration of function by massage, active and passive movements. The present communication has to do chiefly with the first stage—reduction, and, in part, with the second stage—fixation.

The most important aid in the reduction of fractures of the long bones with displacement and shortening is traction in the long axis of the limb. With continuous extension the muscles, tendons, ligaments and fascia can be gradually stretched until the fragments are brought into correct alignment. The soft tissues under tension then act as living splints in maintaining the position.

When a long bone is broken, with overriding of the fragments, the shortened muscles become rapidly fixed in contraction, and the remaining soft tissues lose their extensibility through extravasation of blood and traumatic œdema. These changes are important obstacles in the way of reduction of the fracture by traction. The ease with which reduction can be effected by traction depends upon the extent of the damage to the soft parts, and the time which has elapsed between the injury and the application of extension.

It may be said that two main types of traction are available for obtaining the necessary extension. The first is rapid and of short duration. It consists of traction by hand, or by a screw apparatus on a Hawley table, with the patient under general or local anæsthesia. The second method is continuous and prolonged. The pull on the broken fragments of bone is obtained indirectly by adhesive tape fixed to the skin, or, directly, by metal pins, tongs, or wires applied to the bones themselves.

The first method (rapid manual or instrumental traction) is used with success in recent fractures before resistant shortening has occurred. But when the soft tissues have become fixed because of effusion it is no longer possible to effect manual reduction, and the employment of excessive force by heavy apparatus will do harm rather than good.

The second, or continuous traction method is indicated in all fractures of the long bones where the first method is doomed to failure by the secondary changes in the soft tissues, and in oblique and in comminuted fractures, where extension must be kept up after the reduction

* From the service of Dr. E. M. Eberts, Montreal General Hospital.

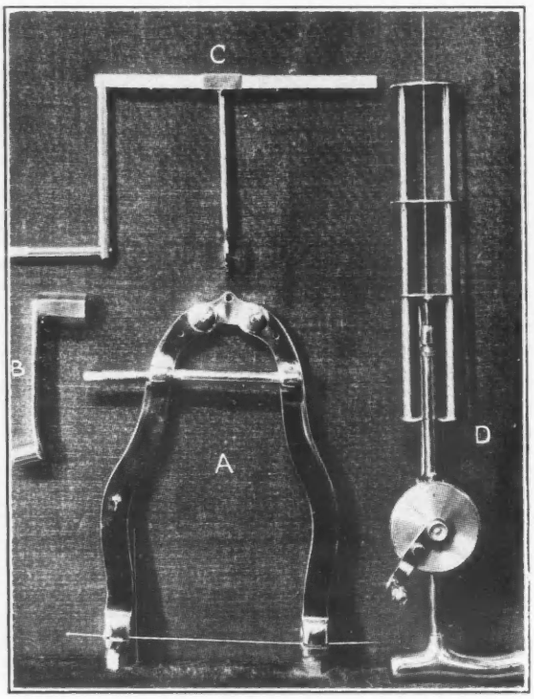

FIG. 1.—Apparatus used in the Kirschner method of skeletal traction. (A) Steel stirrup, with wire in place. (B) Wrench. (C) Schoemaker director. (D) Wire inserter (Loth model) attached to a hand drill.

has been effected in order to keep the fragments in their proper alignment.

Continuous traction may be effected through the application of strips of adhesive plaster to the skin. But adhesive plaster limits the movements of joints, tends to slip and stretch, and often excoriates the skin. It also interferes with the dressing of wounds. In the final analysis it can give only a limited traction because the pull must be transmitted through the fat, fascia, muscles and tendons to the injured bones. For this reason it usually does not succeed in fractures of the lower third of the femur or of both bones of the leg.

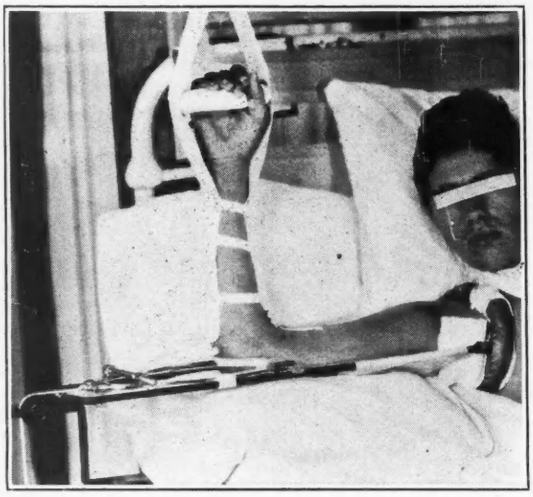

FIG. 3.—Fracture of the surgical neck of the humerus. Kirschner wire in place, passing through the lower end of the humerus just above the condyles. Traction by a five pound weight over a pulley.

Steinmann's method of skeletal traction by rigid metal pins was a great advance in the treatment of fractures. Unfortunately, infection followed so often that this method found few supporters. Steinmann was himself among the first to warn against the danger of infection, but the principle of his method has been sustained through the introduction of improved apparatus. The use of metal tongs ("ice tongs"), whose points pass but a short distance into the bone on either side, was a further advance on the Steinmann pin. The original tongs were devised by Ransohoff and Beasley, and were modified by Pearson and Adams. Infection following their use is rare, but it does occur at times, and the points may pass too deeply into the bones, or slip completely out of place on sudden movements. Moreover, the method is applicable only in the treatment of fractures of the bones of the leg (malleolar

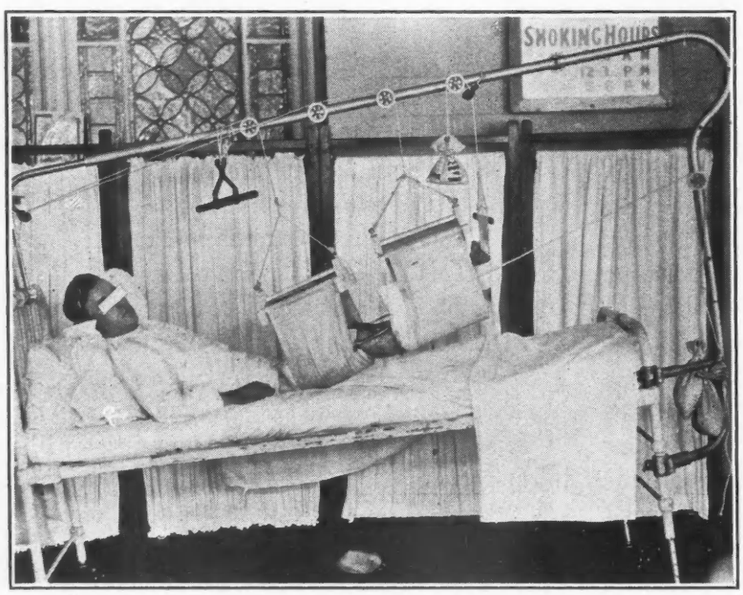

FIG. 2.—Fracture of the lower end of the femur. After skin traction had failed to reduce the fracture a Kirschner wire was passed through the femur at the level of the adductor tubercle. Traction by a twenty pound weight over a pulley. Slings and pillows for the leg and thigh.

FIG. 4a.—Transverse fracture of the lower end of the femur (supracondylar) with backward displacement of the lower fragment. Position of fragments after failure of skin traction.

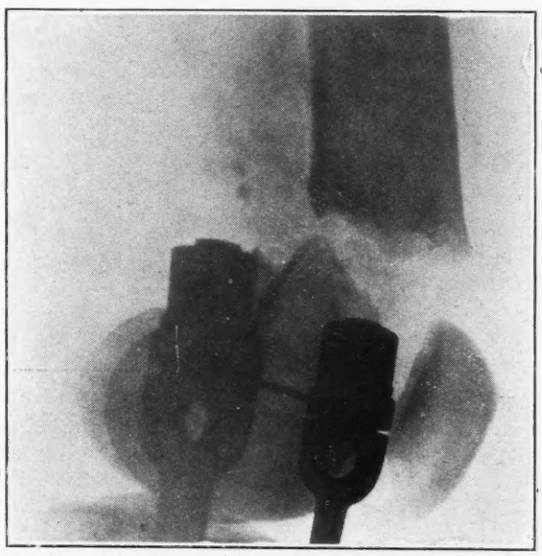

FIG. 4b.—Kirschner wire traction apparatus in place.

FIG. 4c.—Final result. (Case on the service of Dr. A. T. Bazin).

extension) and thigh (condylar extension).

In 1927, Kirschner,[1] published details of his method of obtaining direct continuous skeletal traction by piano wire passed through the bones. The method was developed with the purpose of obtaining the benefits of the Steinmann pins without the danger of infection. In using Steinmann's pins it was found that there were three factors responsible for infection, namely, the large diameter of the pin used, the necessity for preliminary drilling of the bone to receive the pin, and lateral slipping of the bone along the pin after the traction had begun. It had also been demonstrated that the danger of infection was directly proportional to the area of the cross section of the pin used, and it was to reduce this hazard to a minimum that Kirschner suggested the use of piano wire 1.5 mm. in diameter. To eliminate the dangers in preliminary drilling of the bones Kirschner perfected a device for driving the sharpened wire itself through the skin, soft tissues, and bones. This procedure lessens the trauma, abolishes the necessity of skin incisions and preliminary drilling of the bone, and insures such an accurate fit between wire and bone that lateral slipping cannot occur. In the rigid pin method of Steinmann it is obvious that the size of the hole drilled in the bone would have to be a little larger than the diameter of the pin it is destined to receive. In the piano wire method the opening in the bone is made by the wire itself, and there is no dead space around it. After the wire has been introduced its ends are clamped to a "U" shaped steel bow or "stirrup", and the wire is put under tension by a special screw mechanism. Extension is then applied in the usual way, as shown in the illustrations (Figs. 2 and 3). Pull on the steel bow by weights through ropes over pulleys gives complete control of the fragments.

This extension method of Kirschner has been used in the service of Dr. E. M. Eberts at the Montreal General Hospital in fractures of the tibia, fibula, femur and humerus. It may also be made use of in fractures of the bones of the forearm and metacarpus. No infections have occurred.

TECHNIQUE

The limb is carefully prepared as for a bone operation. A local or general anæsthetic may be used. Spinal anæsthesia is very useful in

fractures of the leg or thigh bones. In fractures of the leg bones, the wire is passed transversely through the calcaneus, or through the tibia and fibula just above the malleoli. In fractures of the femur, the wire is passed through the condyles about one centimetre above the adductor tubercle, or through the upper end of the tibia. In fractures of the humerus it is passed through the olecranon, or through the shaft of the humerus just above the epicondyles. In fractures of both bones of the forearm, the wire is passed through the radius and ulna about three centimetres above the radio-carpal joint. A second wire may be passed through the olecranon for counter traction. In fractures of the carpal and metacarpal bones, the wire is passed transversely through the hand, piercing the metacarpals, with the exception of that of the thumb, just proximal to their heads. Counter-traction is obtained by a wire through the olecranon process. The correct insertion of the wire is greatly facilitated by the use of the Schoemaker director.

After the points of entry and exit have been determined the wire is placed in the Schoemaker director (see C. Fig. 1), and the sharpened end of the wire placed against the skin. In order to prevent later traction upon the puncture wounds the skin should be retracted upwards before the insertion of the wire is begun. A Kirschner or Loth inserting instrument (Fig. 1) is used to prevent buckling, and the wire rapidly rotated, either by electric power or by a hand apparatus. By this means a wire can be passed through the largest bones with surprising ease.

After the wire has been passed through the bone, the two ends are securely bolted to a "U" shaped steel bow or stirrup (A Fig. 1). The most efficient is one hinged at the apex and fitted with a divulsing screw by which the wire can be rendered so taut that it gives a musical note when struck, and weights up to thirty or forty pounds can be attached without its bending. No dressing is needed, but it is customary, for appearance's sake, to apply a small piece of gauze to the skin at the points of entry and exit of the wire. The wire itself gives no discomfort, providing the skin has been slid upward before it is passed. The wire will not cut out, even when strong traction is used for long periods. I know of no reported cases where serious infection has occurred. The limb is securely held by this method, and massage and movements of the joints can be carried out from the day of its application.

The position of the fragments is determined by frequent x-ray examinations, and the amount of traction is varied to meet the requirements of each case. Lateral displacement is corrected by felt pads and coaptation splints strapped to the limb. A Thomas splint may be used, but the limb usually rests on canvas slings supported by ropes, and adjusted by counter weights attached to an overhead frame. (Fig 2).

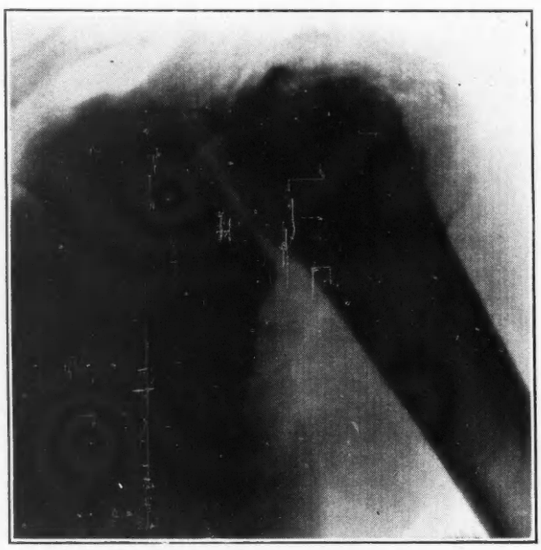

FIG. 5a.—Fracture through the surgical neck of the humerus. Position of the fragments after skin traction and open operation had both failed to effect reduction.

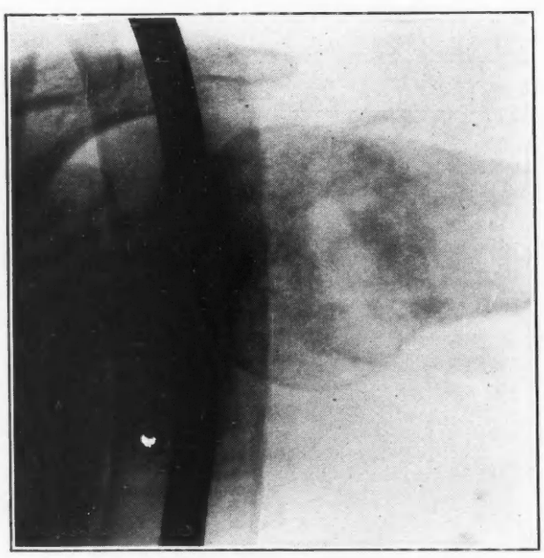

FIG. 5b.—Position of the fragments during the use of Kirschner piano wire traction. The wire was passed through the lower end of the humerus.

When union has begun, the steel bow is removed by loosening the clamps. The wire is cut through on one side flush with the skin, and withdrawn. The limb can then be placed in the usual splints, which are removed daily for massage, until voluntary use can be permitted.

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Clinical Lectures

CLINICAL DIAGNOSIS BY HISTORY ANALYSIS

BY ROSCOE R. GRAHAM, M.D.

Toronto

Ladies and Gentlemen:

The object of this discussion class is to attempt the evaluation of symptoms and physical signs as presented in a well-taken history. As the term proceeds, we shall find that, despite having no elaborate laboratory results in these histories, it is possible to elaborate a correct working diagnosis in well over ninety per cent of instances. Hence the first essential is the ability to take a good history, embracing negative as well as positive information; and the second, the proper interpretation of the information obtained. The following is the history of the case for to-day:—

Mrs. M. T., aged 60.

Complaint.—Pain in the abdomen—duration seven weeks.

Present Illness.—Seven weeks ago, that is about the middle of July, the patient ate some food to which she was not accustomed. Following this she felt some pain in the region of the umbilicus which she attributed to eating food which did not agree with her. The pain, however, was not very severe, and the patient went down town. She came home and was taken with a full, tight feeling, which seemed to start just above the pubes and passed up to the region of the umbilicus. Here it remained for about a minute, and then, with a rolling, gurgling sound which could be heard all over the room, passed down towards the left iliac fossa, sometimes being felt in the back, low down. This tight, full feeling was accompanied by a very hard, aching pain. The patient was nauseated and spit up some fluid. Since then this pain has come and gone about every five or ten minutes, but has not always been so severe. The pain often woke her up at night. Sometimes this tight, full feeling seemed to push up in her stomach and cause nausea, followed by vomiting of a lot of green, salty fluid. This occurred about every two or three days. She also constantly felt swollen and bloated. This pain remained very severe until two weeks ago, when she began to feel somewhat easier. The patient has been up and out, with occasional spells in bed, until the past week, when she has been confined to bed completely. During this time the bowels have moved normally every day. She has suffered no diarrhœa. The stools have been foul, but not tarry, and their colour tends to be somewhat lighter than usual. There has been no vomiting of blood. The appetite has been good, but the patient is afraid to eat because it makes her worse. There is no definite pain, but much belching of gas and a very great dryness in the mouth. Her mouth has been very dry ever since the start, but this has become much worse lately, and is one of her chief complaints now. Especially following eating this dryness in the mouth becomes very pronounced. She used to eat better, but suffers a sour taste in her mouth, and she has had an idea that it made her pain worse, although she is not sure whether it did or not. She is afraid to drink for fear of filling herself up and distending more. Five nights ago she had a very severe vomiting spell. She drank some water, and this caused her to vomit a lot of green, salty, watery material. Sometime later she brought up large quantities of light brown, very foul vomitus, which was exactly like a bowel movement, and she felt much relieved. The woman has lost some weight and a great deal of energy and strength.

Functional enquiry.—She feels in fair health, but strength and energy are gone; some loss of weight; sleeps rather poorly, being often wakened by the pain; not subject to headache; eyesight and hearing good; no cough; a slight amount of sputum; she is not subject to colds or sore throat; no dyspnœa; palpitation or œdema. She is afraid to eat. After eating she feels rather uncomfortable and full, and belches considerable gas. The bowels are regular every day. Micturition—day 6 times; night, 4; she has always been troubled somewhat with frequency. She finds it eases her pain to void. Menopause at the age of 45; no discharge since.

Past illnesses.—Measles, mumps and whooping cough as a child; two attacks of bladder trouble—one eight months ago and one two years ago. These were characterized by frequency and scalding. There is a history of a lump coming in the neck quite frequently during the patient's life, in the middle line, about the size of the top of an egg. The patient would paint this with iodine, and it would gradually disappear. About two years ago this lump returned and took about one month painting with iodine before it disappeared, during which time she felt very weak and run down. This was attributed to the iodine.

Physical examination (general).—A moderately well developed, well nourished adult white female, about 55 years of age, somewhat pale. Every now and then she appears to have a spasm of pain.

Special examination.—The abdomen is full and somewhat distended. It moves only slightly on respiration. There are no areas of rigidity. There is a tense feeling all over. There are no marked areas of tenderness, although the patient complains of some tenderness in the costo-vertebral angles posteriorly, and also some over the right iliac fossa, but this is not so marked. There are no areas of real rigidity. The liver, spleen and kidneys are not palpable, although it is rather difficult to palpate, the abdomen being somewhat tight. The abdomen is more or less tympanitic all over, except in the right iliac fossa, where it is dull on percussion. The distention seems to be a lower abdominal distention, the upper abdomen being not so distended. On palpation in the right iliac fossa there can be felt just in from the anterior superior spine of the ileum about one and a half inches, a mass which is irregular in outline and quite hard. This mass is about three inches long and cannot be well outlined. It seems to be somewhat movable and would appear to be cæcum. On palpation in the neighbourhood, just below the umbilicus, during a spasm of pain, one can feel something contracting beneath the hand, somewhat like a pregnant uterus. This is accompanied by a gurgling, splashing noise and the patient experiences quite severe pain. This lasts for about a moment, and then seems to pass downwards into the left and the spasm disappears. The hernial sites are normal.

Respiratory system.—Negative.

Cardio vascular system.—Negative.

Nervous system.—Negative.

Our old statement that a patient past thirty years of age never suffers from a new gastro-intestinal disease except trauma, acute inflammation and new growth, must be remembered in

connection with this patient. So far as one can gather from this history, there is nothing in her story to lead one to suspect even the minor upsets of her gastrointestinal tract, until the middle of July. If that is true, then we are left with much fewer possibilities in the differential diagnoses than would be the case if we had a similar history in a patient 25 years of age.

The other factor which has been a disability is the cystitis. We are very loth to make a diagnosis of primary urinary cystitis in a man, because we feel that in the absence of instrumentation, it practically never occurs. In a woman, on the other hand, we can have a cystitis with local lesions of a mechanical type. We don't know whether this patient has had children or not, but we find that she has had attacks of cystitis in which there was a night frequency. You can have urinary frequency during the day from mechanical disturbances, particularly from a uterus which has become prolapsed, but it is very unusual to find any disturbance at night, unless you have evidence of pus in the urine. We had one example not so long ago in a patient who had complete procidentia of the uterus and bladder, and on her feet she had a desire to pass urine every ten minutes, yet she would sleep through the night, very rarely having any desire to void. That was a mechanical factor, and not associated with cystitis. Here it is stated that the urinary frequency was accompanied by scalding. Now that does not mean that the woman had a real cystitis. There are two reasons for scalding in a patient who has no evidence of infection in the urinary tract as far as one can tell from urinalysis. The most common, probably, is an alkaline urine, and the most common underlying factor in the production of an alkaline urine is constipation. Alkaline urine will give burning, scalding and urinary frequency, and the story of bladder irritability, but it is not an infective thing, and to correct the alkalinity will correct her disability, and we would infer here that she must have had a very easily corrected lesion, to have it over inside of two weeks.

The other disability which we note in her history is this lump the size of an egg which appears in the mid-line of the neck. Obviously it is a thyroid adenoma. That is interesting too, because we find that this has disappeared following the local application of iodine. You know that certain laws have been laid down about the difference in the thyroid secretion from an adenoma and from a diffuse hyperplasia of the gland. Plummer's original hypothesis was that the adenoma produced excess of normal secretion, whereas the diffuse hyperplasia of the gland produces an excess of an abnormal secretion, the abnormality being the loss of an iodine radicle in such secretion, and his rationale was that we should give iodine in the diffuse hyperplastic thyroids, and that we should not give iodine in the adenomas. Here we have a lump localized, falling into our classification of nodular thyroid, benefited by the local application of iodine. After you have been feeling thyroids for a while, you are going to lose all conceit in your ability to tell clinically whether the individual is suffering from an adenoma or diffuse involvement of the gland. I have reached the stage now where, except in a very obvious case, I hesitate to say this is an adenoma, or that it is solely a diffuse hyperplastic gland. One merges into the other. I feel that it is often practically impossible to tell. Further, we have been making very acute observations for the last few years on the character of the gland surrounding the adenoma, and I had a short discussion with Dr. Robinson yesterday. We have not reviewed the cases since last June, but I think that he has found only one case since October in which there was an absolutely normal gland surrounding an adenoma. In other words, where an adenoma is active there is an activity of the surrounding gland. That finding, coupled with the fact that people who have most to do with iodine, and who are honest in their statements, freely confess that they have not the slightest idea of what iodine does, when it does good, or when it does harm, makes us stop and think. I have laid down the rule in my own practice that I will not give iodine to a patient with any type of thyroid enlargement associated with hyperthyroidism until that patient has come into hospital and given consent to any type of therapy which I considered wise and advisable. Then when they have done that, I give iodine to all the thyroids, irrespective of whether I think they have an adenoma or not, and I have yet to see, except in one instance before operation and one case after operation, where iodine has done harm. In the pre-operative instance it was an adenoma, and in the post-operative instance it was a diffuse hyperplastic gland. So we come to feel that iodine is a tremendously dangerous as well as a very valuable drug in hyperthyroidism. We are seeing every week people come in with what, clinically, we think are adenomata, who give the story that they have been perfectly well all their lives. When they were 15 or 16 years of age they noticed a small lump in the throat, and they were told they had a goitre. Then they went to see a doctor, who was treating them for a cold, and he said, "We will cure that little lump in your neck," and he gives them Lugol's solution, and they take this Lugol's solution, and I am perfectly sure of this point—that iodine will very often activate an otherwise quiescent adenoma. I had one woman who lost thirty pounds in eight weeks, and from being a healthy, happy farmer's wife, able to milk the cows, etc., she came in in eight weeks on a stretcher, with a pulse of 132, 30 lbs. under weight, and having a basal metabolism of 140. So I would just like to throw out that word of warning, because this drug has been indiscriminately used. Apparently it has done good in this case, but was it doing any harm? One thing to remember is that iodine in any form will not cure a hyperplastic thyroid. It will cause an acute hyperthyroid storm to subside, and our patient comes down to normal. It will do it once, and it may

do it twice. It won't do it the second time as spectacularly as the first. The third time it may do it, but it won't do it afterwards except on rare occasions, and the patient goes into her third storm, and you have lost your greatest ally, because iodine following operation or preoperatively in hyperthyroid crises is the greatest ally we have in the treatment.

But this apparently is quite apart from the trouble for which this patient sought relief. She went on for five weeks with a continuous disability, characterized by exacerbations of a more severe type, and then in the seventh week, that is the week prior to her admission to hospital, she is in bed. We have no mention in the whole of this history, of constipation. We have no mention of her distress in relationship to her daily cycle. We have mention of her distress in relation to the intake of anything—either fluids or solids. She has a feeling of discomfort and fulness and belching of gas, but the key note of the disability to me is the statement: "Since then pain has come and gone about every five or ten minutes, but is not always so severe; often it wakened her up at night; it radiated to her upper abdomen; her mouth is dry; she has lost weight; she is tired, and she has a full abdomen."

We will put down some of the things which this might be:—

INTESTINAL OBSTRUCTION

(*a*) Outside the gut; (*b*) In the lumen; (*c*) In the wall of the gut.

A. Small Bowel

(*a*) Outside—Strangulated hernia (Richter's); Bands of adhesions; Volvulus; Intussusception; Involvement by surrounding lesions.
(*b*) In the lumen—Foreign body; Fæcolith; Gall stones; Benign tumours.
(*c*) In the wall—Congenital pyloric stenosis; Tuberculosis strictures; rarely, Malignant growth.

B. Large Bowel

(*a*) Outside—Hernia; Bands; Volvulus; Involvement by surrounding lesions.
(*b*) In the lumen—O.
(*c*) In the wall—New growths: (*a*) Annular (anywhere); (*b*) Cauliflower (cæcum: rectum); Imperforate anus; Syphilis of the rectum.

I think you are all convinced that this patient has an intestinal obstruction. I don't see what other diagnosis you can make. Why? Here is a patient who has been perfectly well up to 60 years of age. She "eats blueberries". Very shortly after eating her blueberries she is seized with pain of a rhythmical, crampy character, which is associated with nausea. In going over the statistics of intestinal obstruction in all the large hospitals, there was no hospital that could show a published record with a gross mortality under thirty-five per cent from acute intestinal obstruction. I expect the fellow who started to go over these statistics was ashamed to publish his records in the same way, so he has been very artful, and he has published his figures in groups, and he has got one group down to thirty per cent. Even juggling his statistics, he could not get an operative mortality under thirty per cent, all of which means that of all the lesions from which we suffer in the peritoneal cavity the most lethal is intestinal obstruction. There must be a reason. There is a reason, and the greatest reason of all is that it is not diagnosed. The death rate in strangulated inguinal hernia is only five per cent or less in many cases. Why? Because it is easily diagnosed, even by the patient who seeks early advice. Here is a woman who goes five weeks, and then in her seventh week is in bed, and throughout her whole disability runs this rhythmical, colicy pain, associated with vomiting. If I see a patient who has previously been well, who is suffering from rhythmical, crampy pain associated with vomiting, I have not the slightest hesitancy in advising immediate operation, if no obvious cause is found. Why? That is the story of intestinal obstruction in the small bowel. Rhythmical, crampy pain, without vomiting until a long time afterward, is the story of an acute obstruction in the large bowel. This woman could not have had absolute intestinal obstruction, because the bowels moved. Now there are other factors which come up in the history. She has a dry mouth. She has no abdominal rigidity. She has an irregular contour to her abdomen. It is more full below than above the umbilicus. If it were a large bowel lesion, one would think that it should be generally enlarged. Another thing which we would think would be found in a patient who has this subacute obstruction over a period of seven weeks is clinical evidence of fluid in the peritoneal cavity.

The next thing which is pointed out in this history, and which to my mind is strong evidence of small bowel intestinal obstruction, is the splashing. During the attacks of pain something is felt to rise up, as if it were contracting under the hand. There is splashing and gurgling. Now that is not going to be obvious unless you look for it, but you are going to find in a very large number of patients who have intestinal obstruction that if you go over their abdomens, with that manoeuvre of pressing down in little jerky palpations, you can elicit splashing in the gut proximal to the obstruction, and you will find that much more commonly in small than in large bowel obstruction. Therefore rhythmical, colicy pain, irregular contour of the abdomen, early nausea, no muscular rigidity, dry mouth, and a splashing in an area dull on percussion to my mind is a small bowel intestinal obstruction until you prove it otherwise. Now this patient has the bowels moving every day. I used to believe, and it is in a lot of the text books, that absolute constipation, or absolute intestinal obstruction, means that there is no passage of flatus in the large bowel. Don't let that fool you. A patient with a small bowel obstruction which has progressed to the stage of gangrene necessitating resection, can pass flatus through the anal canal. Now why? For the reason that that patient has been given enemata and been given all forms of therapy and it is not inconceivable that there may have been air placed in the large bowel. It is not inconceivable also that there is sufficient

fermentation in the large bowel to produce gas, so that, while that is a statement that is very commonly made, and while you see patients with the characteristics we have outlined, and the nurse reports, "I have just given an enema, Doctor, and there was some gas expelled but no content," don't say, "We can wait a little while." You can't wait at all. The other point is that the patient with small bowel intestinal obstruction is much more ill than would appear on the surface. You can walk into the room of a patient with small bowel obstruction who will be dead if you leave him alone, and he may have normal pulse, normal temperature; he will smile and talk to you, until he suddenly stops and says, "Oh, there is the pain again." I have seen that story over and over again, and when a patient stops in the middle of a sentence, grabs the abdomen, and says, "Oh, there it is again"—that is small bowel obstruction, and I want to tell you it often takes a tremendous amount of courage to open the abdomen at that stage.

The one lesion for which you must be absolutely on your guard, which can simulate that picture very closely, is lead colic. Why? Because your physical findings in small bowel obstruction, if it is high enough, does not give you very marked alteration in the contour of the abdomen. But if you think of lead colic, and ask the man what his job is, and look to see if there is a blue line around his gums, or give him half a grain of morphia hypodermically, or 5 c.c. of a 10% solution of calcium chloride intravenously, his bowels will move and his distress disappear. If he has intestinal obstruction and you give him morphia, it will not relieve him for more than an hour or so.

If this patient were younger, say, 30 years of age, there are certain other points that would come up. The point that would come up, with a mass described as we have it in the right lower quadrant, would be the question of a ruptured tubal pregnancy, in which the rupture had occurred into the broad ligament. Here is a patient past the menopause, and we can exclude certain lesions which would arise in connection with the uterus. It is also difficult to consider what would be the cause of small bowel obstruction at 60 years of age. It is much more likely, according to the law of averages, that this patient is suffering from carcinoma involving the large bowel, except that we find sudden onset of pain, and very shortly after the pain we have nausea, vomiting, and the rhythmical, crampy character of the pain which comes up with the regularity of labour pains, and persists over a period of five weeks. We have put down here in our small bowel lesions, all the things which it may be. Outside the wall we have herniæ, which we can rule out because they tell us the ordinary hernial orifices are normal. Bands of adhesions are a possibility, because you have partial strangulation from bands, but the common cause of bands is absent, namely, a former operation. If the patient had a scar on her abdomen from a former laparotomy, we would not have to stretch our imagination very much to ascribe it to this cause.

Then we have volvulus. Volvulus which is going to last for seven weeks is a rare condition.

Intussusception of the ordinary type, and not associated with either a benign or malignant new growth, at sixty years of age, is unlikely. Involvement by surrounding lesion—we have nothing here that will give us a clue that she has a surrounding lesion outside the intestinal tract. Foreign bodies—no reason to suspect this. She has not a fæcolith. She has no history of a biliary disease, and on the surface we should be able to exclude a cholescystitis. Why? Because before the gall stone can enter the large bowel, it must have ulcerated through a viscus in the close proximity, either transverse colon or small bowel, and that is going to tell a story of abdominal pain and fever, which suddenly was relieved without the doctor or operation.

With regard to benign tumours that are going to give lesions simulating obstruction, we have again a type of intussusception, but it is a recurring type, and the patient may go days before its return. This patient has never gone one day without abdominal discomfort.

We have ruled out lesions in the small bowel except bands of adhesions. We have ruled out most of the things in the lumen, and we come to things in the wall. Congenital pyloric stenosis is, of course, absurd. Tuberculous stricture, in the absence of any history of illness previously in the patient's life, is unlikely, and we are left with malignant growth. Now that is all right. I had an old lady last year 76 years of age, who had, when I saw her, a story of five weeks' recurring abdominal pain, and then I was called in at the time that this patient's history was taken. Now what is the difference in the character of her vomiting? It has changed from a salty, watery, greenish fluid, to brown, offensive content. Some of you probably have seen in the paper the story of the woman who was admitted recently. She came into our Ward, and turned out finally to be a case of criminal abortion. That woman was admitted to our Ward as a case of intestinal obstruction, with crampy, abdominal pain, vomiting, and, of course, very ill; it was difficult to get a history, but we eliminated the possibility of an intestinal obstruction being responsible for her disability, because of the character of her vomitus. It was green, and she was desperately ill. Now when the vomitus is green and not brown, the chances that your patient has a serious small bowel obstruction are very slight. You will see this patient goes for seven weeks with a green vomitus, but when the character of that vomitus changes from green to brown, she comes to hospital, and that brown, of course, is jejunal content. The green is duodenal, but when you have obstruction that causes regurgitation of jejunal content it is time to take it seriously. This old lady after six or seven weeks, had pretty much the same story as we have here. She developed brown vomitus, with rhythmical, crampy abdominal pain, and she looked fairly ill. So we cannot rule out the possibility of

malignant new growth in the small bowel. If this is a large bowel lesion, then it must be in association with the proximal large bowel. The commonest thing that is going to happen is not syphilis, nor imperforate anus, and the annular strictures come anywhere, but most commonly in the sigmoid, ascending colon and descending colon. Cauliflower carcinomas as a rule do not produce intestinal obstruction, but you can have a cauliflower carcinoma arising in the cæcum, with perforation retroperitoneally, inflammatory induration about, which will give you your mass and, secondarily, involve the small bowel. So no matter what our obstruction is here, we must, if our hypothesis is correct, feel that small bowel has been involved in some way or other. The cauliflower type of carcinoma of the cæcum gives a peri-inflammatory business, and involves small bowel, and that would be the most likely diagnosis.

DIAGNOSIS.—Inoperable carcinoma of the cæcum.

Operative Diagnosis.—Inoperable carcinoma of the cæcum, involving the terminal ileum.

Case Reports

TWO CASES OF HEART BLOCK

BY W. H. HATFIELD, M.B., AND
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Heart block is a subject upon which a great deal has been written, both from the experimental and clinical standpoints. The mechanism of its production is thoroughly understood, but it is not always that marked gross lesions are demonstrable, as in the two cases cited here. Galabin, in 1875, was the first to record a case of heart block, and it was as late as 1905 before the first post-mortem examination showing changes in the auricular-ventricular bundle was made by Hay. The conduction between the auricle and ventricle depends on this bundle, so that when a complete heart block occurs we find a lesion affecting either the node or the a-v bundle. At times complete heart block is found where the lesion is slight, and in other cases gross lesions have caused only milder grades. In complete block the ventricles lose the controlling influence of the auricles and beat in a slow regular fashion, the impulses originating in the ventricles. Among some of the causes of this condition, are diphtheria, tuberculosis, syphilis, tumour, etc. The two following cases demonstrate an inflammatory lesion with fibrosis and calcification.

CASE 1

Mrs. F., aged 36, was first seen on December 24, 1928. She had been in her usual good health up until one week previously, when she suddenly collapsed on the floor. She was unconscious for some time, probably one-half to one hour. Involuntary micturition occurred with the attack. After that she had recurrent attacks at varying intervals. She was admitted to the hospital and closely watched. The attacks were similar in nature with minor variations, a typical one being as follows:—

The patient suddenly felt nauseated. Her face became pale; the eyes opened wide and the eyeballs turned up and to the left; the pupils remained the same. Consciousness was then lost with some stiffness of the limbs, the eyelids closed and the face became flushed. It seemed as if some convulsive movement was about to occur, then consciousness would be regained. All attacks, except the first, lasted only a short time, usually about one minute. There was no dizziness either before or following the attack.

Her past and family histories contained nothing important.

Physical examination.—She was a big healthy-looking woman. Of her few remaining teeth two were infected. Examination of the lungs, abdomen, nose and throat was negative. There was a systolic murmur over the whole cardiac area, especially marked in the aortic region, but no evidence of any cardiac enlargement. The rate was variable, sometimes running as low as 30 to 40 and at other times to 80. The blood pressure was 130/80. The pupils reacted to light and accommodation. The knee and ankle jerks were increased; there was some ankle clonus and plantar flexion.

Examination of the eye grounds showed small

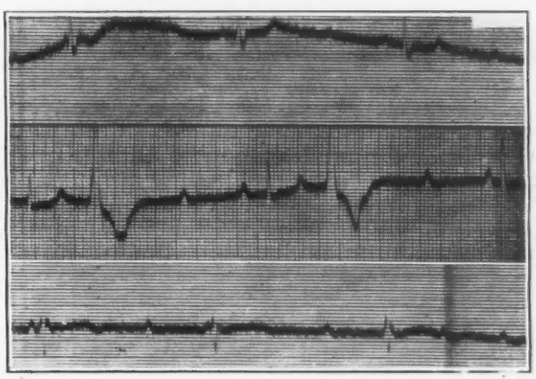

FIG. 1.—Electrocardiogram of Case 1.

petechiæ. The edges of the discs were blurred and the physiological cup was marked. There was no venous engorgement, and the arteries were normal. There was a constant slight temperature. The urine was negative.

Progress.—On January 5th she had three attacks in the morning, then felt well for an hour. In the next four hours there was a constant series of attacks. During this time the heart rate would run around 60 for five to twelve good beats, followed by a period varying from 6 to 20 seconds when no heart sounds could be heard; the face would become pale and consciousness was lost. The return of the heart sounds would be accompanied by flushing and a return of consciousness. She was given barium chloride 30 mgm. every 6 hours, and 1¼ hours after the first dose the attacks stopped for 36 hours, only to begin again, as bad as ever. From time to time vomiting occurred.

On January 10th the heart rate remained at 32 with occasional extrasystoles. When block became complete she felt better. On January 13th she had nine attacks. This continued on into February when she was given digitalis. On February 19th she had been feeling well all day and death suddenly occurred late in the afternoon.

Autopsy.—The chief features of interest were in the heart. The pericardial cavity contained no excess of free fluid. The heart weighed 640 grm.; the musculature was rather friable but of fairly good colour. The left ventricular wall was 2.5 cm. in thickness. The aortic valve was markedly sclerotic, the cusps all fused and edges everted, with some roughening of the margins, but with no definite vegetations. The orifice measured 0.5 cm. and the mitral valve was also somewhat thickened, but not stenosed. This sclerosis extended to the interventricular septum in the region of the bundle of His, and probably involved many of the fibres. The coronaries were rather tortuous, but not sclerotic; the left was intact, but the right was markedly narrowed, though not completely occluded. Relatively little of note was found on abdominal examination, the viscera showing only a moderate degree of passive venous congestion.

Anatomical diagnosis.—Sclerotic aortic and mitral endocarditis, with aortic stenosis; probable pressure atrophy of fibres of the bundle of His, producing heart block; myocardial degeneration; right coronary stenosis; hypertrophy of the left ventricle.

Microscopical findings. — Sections through the heart muscle were taken in several different areas and they showed well-defined fragmentatio myocardii. The cross striations of the various muscle fibres were rather poorly defined, the nuclei being relatively indistinct, while throughout there was both a finer and coarser interfibrillar fibrosis, in some areas amounting to dense patches, with a diffuse but slight small round cell infiltration. Sections through the sclerotic material in the interventricular septum, approximately in the region of the bundle of His, showed very marked fragmentation of the muscle fibres, very extensive fibrosis, for the most part hyaline, in which calcareous degeneration had occurred. The fibrosis was both fine and coarse, the coarse fibres completely replacing the muscle tissue in many instances.

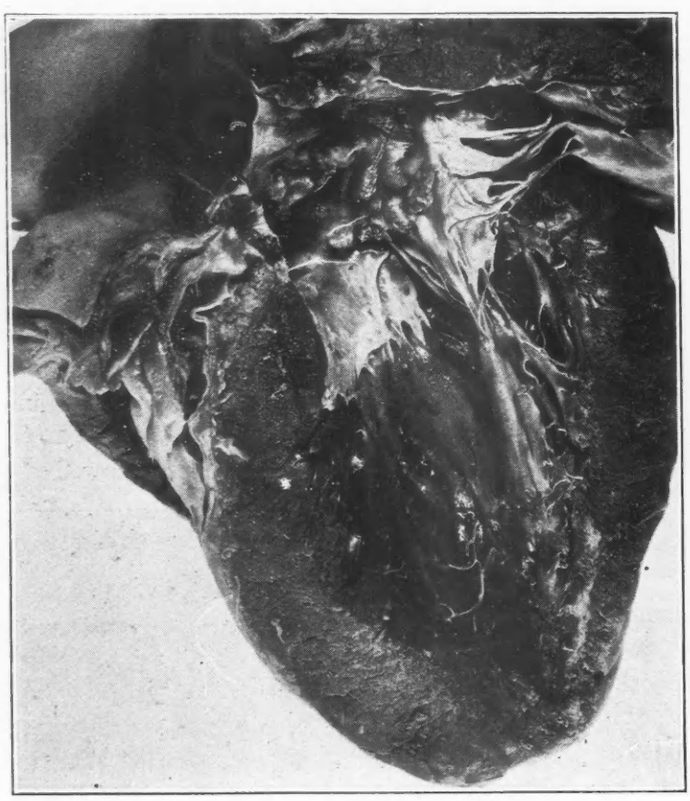

FIG. 2.—Heart of Case 1, showing the gross changes around the aortic valves and near the bundle of His.

CASE 2

Mrs. C., aged 58. She had been a diabetic for some years, on a diet and taking insulin. For two years before her death her eyesight had been failing, and she found it difficult to measure

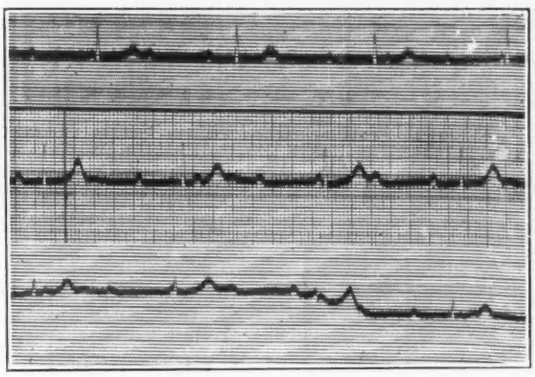

FIG. 3.—Electrocardiogram of Case 2.

her insulin and was at times careless with her diet. Consequently, she twice went into coma, requiring hospital treatment and from which she made an uneventful recovery. In July 1929, she began to have dizzy spells lasting only a few minutes and then passing away. On one occasion consciousness was lost for several minutes. After this the patient was admitted to hospital. At this time the diabetes was fairly well under control.

Her past and family histories contained nothing else of importance.

Physical examination.—The patient was a rather large, moderately healthy-looking woman. The examination of nose and throat was negative. The teeth were all out. Vision in both eyes was very poor owing to diabetic cataracts. The heart rate was 40 to 50, sometimes running up to 60. Otherwise the examination of the heart was negative. Physical examination did not reveal anything of consequence. The blood pressure was 160/90. On admission the urine showed a trace of sugar which readily disappeared with treatment. The Wassermann test was negative.

Progress. — The patient was quite comfortable lying in bed, but frequently on sitting up would become very dizzy and have to lie down. The pulse rate continued low and an electrocardiograph tracing substantiated the diagnosis of complete heart block. Digitalis was given and she gradually seemed to improve and was able to sit up for short intervals without any discomfort. Suddenly, on August 15th, she became dizzy and died in a few minutes.

Autopsy.—The chief findings were as follows: The left lung was free in the pleural cavity, quite œdematous on section, and the right was adherent over its posterior and lateral surfaces from old dense fibrous adhesions. The pericardial sac was intact and contained about 100 c.c. of slightly blood-tinged serous fluid. The heart was moderately enlarged and very fatty; it weighed 375 grams; the musculature was extremely soft and pale. The aortic cusp of the mitral valve was very sclerotic at its base, this sclerosis extending laterally and somewhat superiorly, and showing considerable reaction as though of scar tissue. This sclerosis was also present at the base of the opposing aortic cusps and was in the region of the bundle of His. There was, despite this rather extensive sclerosis, no apparent distortion of the valve rings. The remaining valves, coronaries, and aorta were intact. The pancreas was definitely atrophied, and

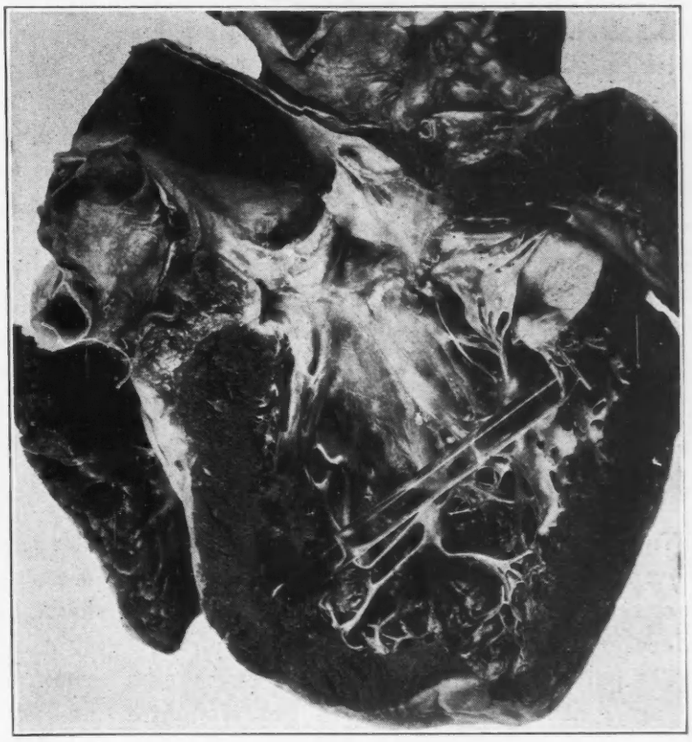

FIG. 4.—Heart of Case 2 showing the gross changes in the the region of the bundle of His.

the liver was slightly enlarged, and on section presented a quite congested surface. The kidneys were both about half as large again as normal. The capsules stripped easily, leaving a smooth surface, and on section the cortex of each was seen to be of normal width, but rather pale, the medulla standing out in marked contrast to it. The abdominal aorta, especially at its bifurcation into the common iliacs, showed well-marked arteriosclerosis and atheromatous change.

Anatomical diagnosis. — Marked myocardial degeneration; marked mitral and aortic sclerosis, without valvular distortion, extending into the interventricular septum, with apparent involvement of the bundle of His and consequent heart block; atrophy of the pancreas; œdema of the lungs; chronic right-sided pleurisy.

Microscopical findings. — Sections taken through the heart muscle and through the calcareous areas in the interventricular septum, presumably about the region of the bundle of His, showed a process almost identical with that seen in the other case, the only difference being in the degree of calcification, this in the second case being somewhat less.

From the foregoing microscopical examinations, it seems to some extent reasonable to put forth the hypothesis of very marked fibrosis and calcification as the causative factor for the Stokes-Adams syndrome in these two cases. We feel that many of the radiating fibres of the bundle may have been involved, and either destroyed or atrophied by this fibrotic process, their conductability thus being impaired.

A CASE OF CORONARY OCCLUSION

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This case of coronary occlusion is thought to be worth reporting on account of the series of electrocardiographic tracings that were obtained.

The patient was a Polish labourer of 50 years of age. He was admitted to the Mountain Sanatorium on October 12, 1930, as a case of moderately advanced pulmonary tuberculosis, chiefly involving the left lung. This diagnosis was confirmed by x-ray examination and by finding tubercle bacilli in the sputum. His only previous illnesses had been frequent colds in the head. The family history was not remarkable.

Examination of the cardio-vascular system on admission showed the heart to be slightly enlarged. It was regular in force and rhythm and no adventitious sounds were heard. The peripheral arteries were thickened and tortuous, and marked arcus senilis was present. Blood pressure, 120/80. Urine, normal.

The patient did well so far as his tuberculosis was concerned. His temperature promptly fell to normal when he went to bed; his sputum became consistently negative for tubercle bacilli. He was gradually allowed exercise, so that by the summer of 1930 he was taking forty minutes of walking exercise daily.

In August, 1930, he was allowed to go down town for the afternoon, and on his return it was found that his pulse rate had gone up from about 85 to about 110. It remained at this high level for several days, and then came down to the previous rate of 85. This acceleration of pulse rate was, at the time, thought to be due to an activation of his pulmonary tuberculosis, as a result of allowing him a little more exercise than he had been accustomed to for the previous year.

On August 8th, he first began to complain of pain, described as soreness over the upper part of the left chest, in front and at the back. This pain was brought on by movement of the left shoulder and was not aggravated by deep breathing. The pain was not severe and was not constantly present, but recurred at intervals up to the time of his coronary occlusion. On September 4th, at a quarter past eleven in the morning, he suffered a coronary occlusion while lying in bed. He was found in a state of extreme collapse, with his face of a ghastly pallor, and a cold perspiration all over his body. He was quite conscious, but was in a condition of shock. The pulse could not be felt, and only an occasional faintly audible heart sound could be heard with the stethoscope. The pulse gradually returned and the heart became audible. Its rhythm was grossly irregular for a few moments, and then became more regular, but with frequent extra-systoles. These gradually became fewer, and within ten or fifteen minutes a regular rhythm was re-established at the rate of

58 per minute. Before this occurred the patient had recovered sufficiently to complain of severe pain beneath the upper end of the sternum, radiating downwards and to the left. He was not in the least dyspnœic.

Four minims of adrenalin was given subcutaneously, followed at once by five grains of caffeine-sodium benzoate. After this the patient began gradually to improve. His progress is summarized below:

September 4th.—11.15 a.m. Onset of symptoms. 11.30 a.m. Heart rate 59—temperature 95, 2/5°. 12.00 noon. White blood count 10,000 per c.mm. 12.30 p.m. Pulse 52, pain becoming severe. 1.40 p.m. Pulse 50, pain very severe, morphine sulphate gr. 1/4, given hypodermically. 2.45. Temperature 97°; white blood count 17,200; pulse 72. 5.30 p.m. Temperature 94, 4/5°; pulse 75; white blood count 12,800; blood pressure 140/120. 10.30 p.m. White blood count, 13,700.

September 5th.—9.30 a.m. Pulse 75; temperature 100°. He was complaining of pain which was now less severe than before. 12.25 p.m. White blood count, 12,800. 6.40 p.m. A loud rub was heard over the tricuspid area and was synchronous with the heart beat. Temperature 101, 3/5°; white blood count, 11,400.

September 6th.—9.00 a.m. The rub heard the previous night had disappeared; the patient looked a great deal better. Temperature was still 100°.

September 7th.—9.00 a.m. The patient looked a great deal better, the pain was all gone, and he stated that he now felt well. His temperature fell to normal by next morning and remained so.

His further progress has been uneventful towards recovery. His pulse rate a month after the occurrence of the occlusion was about eight beats per minute more rapid than before.

Electrocardiographic records.—A tracing taken seven months previous to the occlusion is shown in Fig. 1 and is normal.

A tracing made half an hour after the occlusion showed that changes had already occurred in all leads and were most marked in lead 3, in which the curve came off the descending limb of an erect Q R S, well above the iso-electric level, passing on to the T wave without reaching this level. This is the most typical form of the "Coronary T". Fig. 2 is a tracing made one hour after the onset of symptoms and shows this type of T well marked in lead 3 and less well marked in lead 2. The T waves are now greatly

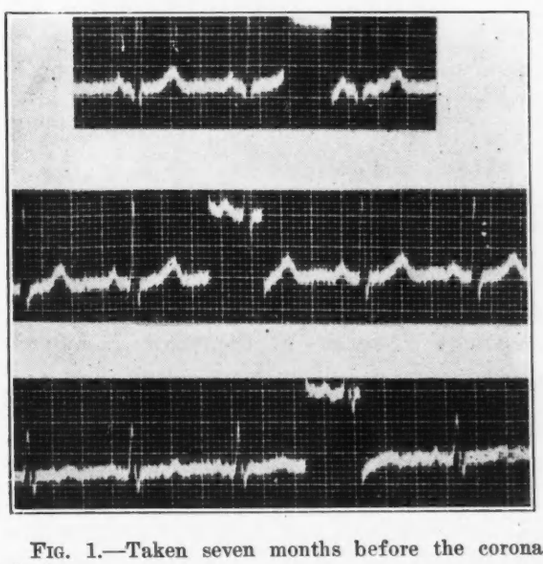

FIG. 1.—Taken seven months before the coronary occlusion.

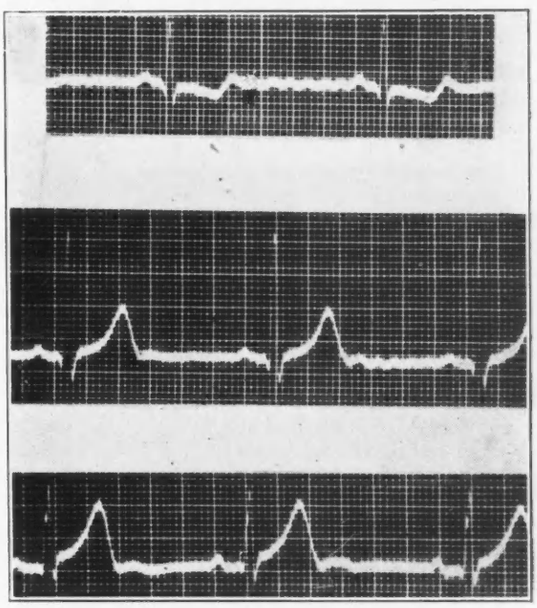

FIG. 2.—Taken one hour after the occlusion.

increased in amplitude as compared with Fig. 1, and this too is a frequent characteristic of the T wave following coronary occlusion. During the next 24 hours five more tracings were made and demonstrated changes in the shape of all leads at each successive observation. These changes were but slight in lead 1. Indeed lead 1 would pass for normal eleven hours after the occlusion. In lead 2 the amplitude of the T wave gradually lessened, became low and diphasic eleven hours after the occlusion, and became frankly upright again twelve hours later before becoming permanently negative as shown in Fig. 3, which shows the tracing made 28 hours after the occlusion. In lead 4 the amplitude of the T wave decreased gradually, becoming permanently negative in the tracing made eleven hours after the occlusion.

The Q R S remained mainly upright throughout, but showed a negative phase almost equal to the positive phase in lead 1 of the tracing made 11 hours after the occlusion. This how-

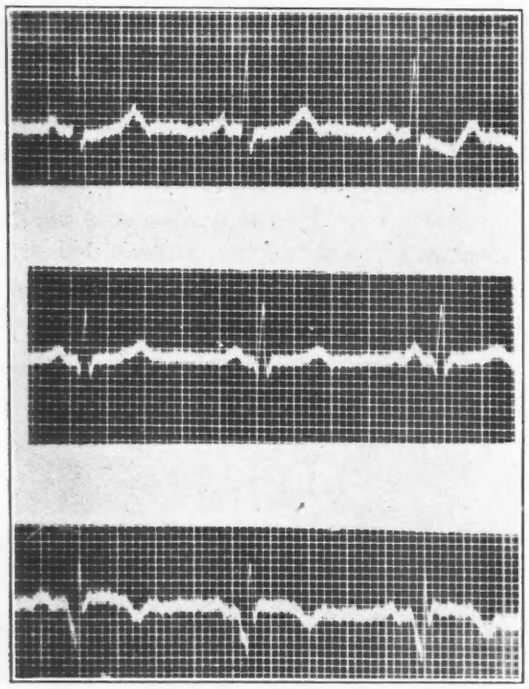

FIG. 3.—Taken twenty-eight hours after the occlusion.

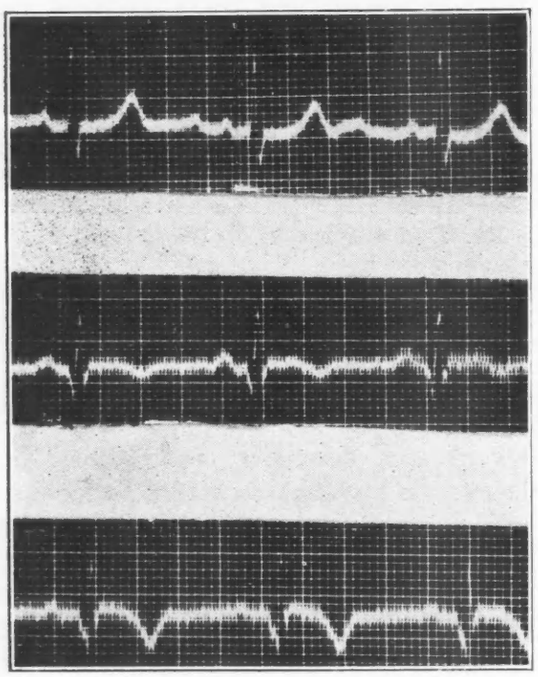

FIG. 4.—Taken forty-eight hours after the occlusion.

ever gave place to the form shown in Fig. 3, 28 hours after the occlusion. It is suggested that this change is more likely due to a rotation of the heart, than to an actual change in predominance, for the latter would imply a second occlusion.

Fig. 4 was made 48 hours after the occlusion. Note the extra-auricular (?) deflection between T and P in lead 1. A tracing made a month later showed T_2 and T_3 still negative, and was very similar in form to those in this illustration. Unfortunately, alternating current interference has somewhat obscured the form of this tracing.

COMMENT

The transitory nature of the electrocardiographic changes and of the leukocytosis and of the pericardial rub are well demonstrated by this case. The absence of dyspnœa was remarkable.

TWO ATYPICAL CASES OF LEUKÆMIA*

BY H. I. PALMER, M.B.,

Brantford

Leukæmia was first described in 1841 by Virchow and Bennett, but it was not until 1883 that Ehrlich differentiated between the two main types, *i.e.*, lymphatic leukæmia and myelocytic leukæmia. Neumann, however, in 1878, had already shown the bone-marrow to be affected in all types of leukæmia, and held that lesion to be the essential feature. Ehrlich contended that the two main types were differentiated by their origin in the bone marrow and lymphoid tissue respectively, which contention is undoubtedly supported by the blood picture in the typical types, myelæmic and lymphæmic, where there are marked contrasts. But examination of the bone-marrow in cases of lymphatic as well as myelocytic leukæmia shows that without exception this tissue is extensively affected, and, further, the atypical cases of leukæmia, *i.e.*, where the alterations of the blood depart in some ways from the expected type, differ in no respect in their broader anatomical lesions from the typical leukæmias, many showing characteristics of both types.

Thursfield believes that the modern hypothesis is slowly shaping itself again to Neumann's conception of the disease, namely, that it is essentially a disease of the whole hæmopoietic system, marrow, spleen, and lymph glands, and that in every case of leukæmia all these are involved, though with differing degrees of in-

* Read at the annual meeting of the Canadian Society for the Study of Diseases of Children, Brockville, June, 1930.

tensity. If this be accepted the so-called aleukæmic or atypical cases are simply varieties of disease of the hæmopoietic system.

CASE 1

James H., aged 9 years, was first seen on April 26, 1928, on account of black and blue spots, pallor, tiring easily, breathlessness, and "heart thumping" on any exertion. This dated back for about two weeks.

Family history.—Unimportant.

Past history.—He had had whooping cough in 1923, chicken pox in 1925, with apparently good recovery; occasional attacks of tonsillitis; and had been subject to periodic attacks of bronchitis.

Present illness.—His mother stated that the boy had been perfectly well until about two weeks before, when she noticed large dark areas scattered over his body, which she thought were bruises. The boy complained of being tired after school and did not desire to play outside as usual. He would complain of his heart "thumping", and would become breathless on going up-stairs. The pallor increased and advice was sought on account of increasing weakness.

Physical examination.—When first seen the boy was not acutely ill, but appeared to be well developed and well-nourished. Pallor was rather pronounced. The positive points on examination were the presence of many small petechiæ scattered over the face, neck, chest, and to a lesser extent on the extremities, with several areas of ecchymoses varying in size from one-half to 3 cm. in diameter on the legs, chest and right arm. The tonsils were small but slightly inflamed and cryptic. There was a slight amount of blood oozing from the gum of the left upper first molar. The anterior cervical glands were palpable. The heart was enlarged slightly to the left, and a faint blowing systolic murmur could be heard over the entire precordium, with no definite propagation. The liver was palpable 1 cm. below the costal margin; the spleen was not palpable. The temperature was 99°; pulse 108.

Laboratory findings.—Erythrocytes 1,730,000 per c.mm.; leukocytes, 6,150; hæmoglobin, 30 per cent; polymorphonuclear neutrophiles 25 per cent, small lymphocytes 35 per cent, large lymphocytes 20 per cent, eosinophiles 1 per cent, basophiles 1 per cent, neutrophilic myelocytes 10 per cent, basophilic myelocytes 3 per cent, transitionals 5 per cent. The bleeding time was 2 minutes. The urine contained a trace of albumin, and an occasional red blood cell was seen on microscopic examination.

Course and Treatment.—The child was put to bed at rest, given a generous diet, and placed on calcium lactate, gr. v every 4 hours, and Ferri et Quininae Citras, gr. ii, three times a day.

Five days later he had a profuse hæmorrhage from the left nostril, which was for a time controlled by cold compresses and the administration of 1 c.c. of hæmostatic serum. The following day the epistaxis recurred from both sides and was controlled only by tight packing. Later in the day, however, the hæmorrhage recurred in spite of packing and the boy commenced vomiting dark brown blood. The temperature rose, ranging from 102° to 104°; pulse 120 to 140. He became very anæmic; the lips, ears and finger nails were pale. He was restless and complained of pain in the arms and thighs. He was then transfused with 400 c.c. of paternal blood.

May 3rd. His condition seemed gradually to improve, there was no recurrence of hæmorrhage, but he took nourishment poorly. The temperature and pulse remained high. May 6th. The child was very restless and irritable, this becoming more pronounced during the afternoon. During the evening hæmorrhage occurred from both nostrils and from the left ear. This increased in severity, and continued in spite of packing, the administration of 2 c.c. hæmostatic serum and, later, of 5 c.c. of boiled cow's milk subcutaneously. The pulse became weak and thready, the eyes fixed; air-hunger was marked. The second blood transfusion of 300 c.c. was given and his condition improved.

The boy was admitted to the Brantford General Hospital the following day. On admission, examination of the blood showed erythrocytes 1,930,000; leukocytes 4,250; hæmoglobin 30 per cent; small lymphocytes 24 per cent, large lymphocytes 17 per cent, large mononuclears 6 per cent, polynuclear neutrophiles 20 per cent, basophiles 1 per cent, basophilic myelocytes 12 per cent, neutrophilic myelocytes 10 per cent, eosinophilic myelocytes 9 per cent, transitionals 1 per cent. An occasional

nucleated red blood cell was also seen. Urinalysis was negative.

The following day there was a slight oozing of blood from both ears, and red blood cells were found in the urine. In spite of stimulants and administration of fluids interstitially and per rectum the patient gradually became worse; the temperature continued from 102° to 104°, and the oozing of blood from nostrils and ears did not improve. The patient complained of pain in the long bones, which was relieved only by the administration of codeia. He died the following day.

The day preceding death the erythrocytes were 1,680,000, the leukocytes 3,200.

CASE 2

Muriel C., aged 3 years, was first seen February 17, 1930, on account of loss of appetite, pallor, and black and blue spots on legs, dating back for a period of about two weeks.

Family history.—Unimportant.

Past history.—Unimportant.

Present illness.—The mother stated that the child was perfectly well until about two weeks before, when she noticed that she became pale, listless and irritable and lost her appetite for food. About this time several bruised areas appeared over the legs. The mother stated that the day before some of the bruises had increased in size and she noticed in addition several small bright red areas on the legs.

Physical examination.—The child was extremely irritable and was examined only with some difficulty. She was well developed, and fairly well nourished, with moderate pallor. There was a slight epistaxis from the right nostril, and a petechia, about 2 mm. in diameter, was seen on the anterior pillar of the left tonsil. The liver was enlarged to about 4 cm. below the costal margin, and the spleen palpable about 3 cm. below the costal margin. Several ecchymoses were present over the lower extremities, and many small petechiæ were scattered over the entire surface of the body, more particularly on the extremities.

Laboratory findings—Urinalysis was negative. Erythrocytes 1,850,000; leukocytes 102,000; hæmoglobin 35 per cent; small lymphocytes 98 per cent, polymorphonuclears 2 per cent. The temperature was 100°.

The girl was admitted to the Brantford General Hospital, transfused with 250 c.c. of paternal blood, and discharged the following day. Five days later (February 23rd) her ecchymoses and petechiæ were much less marked, the liver and spleen were perceptibly smaller, and there was no recurrence of hæmorrhage. She had contracted from her mother, however, an acute follicular tonsillitis, with a temperature of 102°.

The usual treatment was instituted, but her condition grew worse and she was re-admitted to the Brantford General Hospital four days later, on February 27th. Many more petechiæ had appeared over the entire surface of the body, more particularly the forehead and abdomen. The liver was again enlarged about 5 cm., and the spleen was palpable just below the costal margin. Both tonsils were acutely inflamed and covered with a serous exudate, which on repeated cultures were negative for Klebs-Loeffler bacillus, the predominant organism being staphylococcus. The anterior cervical glands were enlarged to the size of hickory nuts and tender on palpation. The leukocytes had dropped to 1,800, nothing but small lymphocytes being found on stained smear. She was given an indirect transfusion of 250 c.c. of paternal blood and stimulants were administered but her condition gradually became worse. March 1st, the platelet count was 36,000, leukocytes 1,000; the tonsillitis had not subsided, and many papules and vesicles, characteristic of chicken pox, appeared over the entire surface of the body. The patient died the following day.

Permission for an autopsy could not be obtained in either case.

COMMENT

These cases are of interest in the first place on account of the leukopenia present, the first case showing successive leukocyte counts of 6,150, 4,250, and 3,200; and although the second case showed at first a leukocytosis of 102,000, the white blood count subsequently dropped to 1,800 and later 1,000.

In the second place these cases were both atypical insofar that, while the liver and spleen were definitely enlarged in one case, the blood picture showed an almost entire predominance of lymphocytes, and in the other case myelocytes were present in the blood stream; in other words the hæmatological findings were opposite to

what one would expect from the physical characteristics.

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A CASE OF PYLORIC OBSTRUCTION RESPONDING TO MEDICAL TREATMENT*

BY WALTER DE M. SCRIVER, B.A., M.D.,

Montreal

The patient is a male 73 years of age, who up to the beginning of April, 1930, had enjoyed good health. At that time he first noted a dull pain in his upper abdomen, associated with constipation and anorexia. Three weeks later he commenced to vomit, at first at intervals of one to two days, large amounts of coffee ground material, which came up suddenly, with very little associated nausea. Later, the vomiting became more frequent, usually an hour or two after meals, with relief of the pain. The loss of weight was marked, and his strength failed rapidly.

When first seen on May 24th he appeared much emaciated and weakened, with prominent malar bones, sunken eyes, and a general appearance of marked loss of weight and dehydration. Apart from a moderate degree of arteriosclerosis and many carious teeth, the chief interest lay in the abdomen, which was full in the upper half, but flattened in the lower portion. No peristalsis could be made out, but there was a palpable and easily heard succussion splash. No mass was palpable. When the stomach tube was passed about 1500 c.c. of dark fluid were evacuated, in which free hydrochloric acid was demonstrated. A barium examination was reported on as follows: "After six hours about 50 per cent of the meal remains in the stomach, the rest lies in the ileum. The stomach is large, J-shaped, is seen to contain fluid, and has no irregularities. Good peristalsis, but no cap forms. Twenty-four hours later about 50 per cent of the meal remained in the stomach." An x-ray diagnosis was made of "pyloric stenosis, caused probably by a duodenal ulcer, and giving rise to at least 24-hour gastric retention."

Examination of the stool failed to show gross or occult blood, and no signs of tetany were noted. The blood Wassermann test was negative.

While he was making up his mind to enter hospital, atropine therapy had been tried, with no other effect than a marked drying of the mouth. In view of his age and extremely poor physical condition, operative procedures were not considered safe, but, on the other hand, the continued vomiting was rapidly bringing the condition to a lethal termination. It was therefore decided, after consultation with a surgeon, to try to improve the general condition by non-surgical methods, preliminary to the performance of a gastro-enterostomy. Accordingly, the stomach was washed out twice daily, and intravenous injections of 400 c.c. of 20 per cent glucose in normal saline, followed by 100 c.c. of normal saline, were given morning and night. On the third day feedings of 250 c.c. of orange juice, egg-nog, or milk, in rotation, were given in addition every three hours during the day. However, when the tube was passed in the morning a large residue from the preceding day was always present.

As the general condition of the patient improved after five days under this regime operation was discussed with him, but was emphatically refused. Consequently, it was decided to continue treatment as before, gradually increasing the feedings, but little encouragement was given the patient or his family as to prognosis. Four days later feedings were increased to every two hours, from 8 a.m. to 10 p.m., consisting of a glass of orange juice, egg-nog, or milk, to each of which two tablespoonfuls of lactose were added, and once daily a small portion of cream of wheat with sugar and cream. The success of this did not appear great, as 600 c.c. of gastric contents were evacuated in the morning lavage.

At this stage the patient, who had been taught to pass the stomach tube and carry out the lavage by himself, was sent home with orders to follow the same diet, and wash out the stomach each morning before taking food. He was observed at frequent intervals, and as the morning gastric residue decreased, the diet was increased in quantity and quality, though the principle of small, frequent, fluid or soft feed-

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* From the Department of Medicine, McGill University Clinic, Royal Victoria Hospital, Montreal.

Presented before the Montreal Medico-Chirurgical Society, October 17, 1930.

ings was adhered to. The gastric lavages were decreased as the morning residue decreased, at first to every second day, then twice weekly, and are now (October, 1930) but once weekly. As a rule the stomach was found empty after the first month at home, but occasionally some residue from the previous day was present. These occasions became further apart, and for the past month the stomach has been found empty.

The patient feels much better and has put on weight, from 113 lbs., at the time of his discharge from hospital in June, to 143 lbs., four months later. As he lives above his store, he is able to go about his work and attend to business, and still receive his frequent feedings at the prescribed hours.

At present his daily diet is as follows:—

7. a.m.—1 glass of milk with 2 tablespoonfuls of lactose
1 soft boiled egg.
10 a.m.—Cream of wheat or porridge—6 tablespoonfuls with sugar and ½ glass of milk and cream mixture.
12 noon.—Scraped beef,—2 tablespoonfuls, or equivalent of finely minced lamb chop
1 baked potato with butter and gravy or green vegetables passed through sieve.
2. p.m.—Egg nog—1 glass with 2 tablespoonfuls of lactose.
4. p.m.—1 piece of soft toast with maple syrup or jam or milk or rice pudding
1 glass of milk with 2 tablespoonfuls of lactose.
6. p.m.—Orange juice—1 glass.
8 p.m.—1 soft boiled egg and 1 glass of milk with lactose.
10 p.m.—Cream of wheat as at 10 a.m.

This has a value of approximately 1,850 calories, which is about 20 per cent above his predicted basal calories, and, as shown by his gain of weight, is more than sufficient to keep him going. The protein content is about 60 grammes, and there appears to be a sufficiency of vitamines.

On October 16th a further x-ray examination, by means of a barium meal, showed the stomach empty at six hours. There was no delay in the emptying of the stomach as seen under the fluoroscope, and the tone was good, while a good duodenal cap was formed. There was a marked contrast between the much dilated atonic stomach of June, and the present picture.

COMMENTS

Possibly the significant feature of this case is that necessity was the mother of careful and painstaking therapeutics. Medical treatment was undertaken, with a rather hopeless prognosis, because the patient had refused to undergo an operation, the prognosis of recovery from which in a man of his age and physical condition appeared also rather hopeless. The intravenous therapy helped to supply to the body the salts and fluids of which it was depleted by the continued vomiting, the frequent lavages helped to prevent continued over-distension of the stomach and to promote the recovery of normal size and tone, and the small frequent fluid feedings allowed the passage of food through the constricted pylorus without tending to increase the distension.

What the actual lesion was I am not prepared to say; suffice it that there was clinical and x-ray evidence of well-marked pyloric stenosis. The net result of our treatment is that we have before us a useful citizen, in good physical condition, able to carry on with some slight inconvenience to himself, who was not exposed to the shock of operation or to post-anæsthetic complications, with possible fatal consequences. But our present result would have been impossible if we had not had the intelligent and faithful coöperation of that most important person, the patient himself.

CHANGES AND CHANCES.—Fleet Surgeon W. E. Home, R.N.(ret.), writes: Your mention of the death of Fleet Surgeon W. Redmond (at Vancouver, at the age of 90) recalls to me three of his experiences. The first illustrates the changes of fortune. Sixty years ago he served in a sailing brig, under a lieutenant who used to complain to Redmond that he must soon retire, as there was no chance of promotion in the navy. Luckily he delayed a little; the tide turned, and he finished up, thirty years later, an Admiral, with a G.C.B. and G.C.M.G. and a Colonial Governorship to his credit. Redmond himself on retirement practised in Eastern Canada, but as he had once to drive ten miles to a labour case, and on the way got off the road into a snowdrift (from which his horse and trap were only rescued by driving in a herd of cattle to make a path out, spent a night from home, and only got 5 dollars, he thought the rewards too meagre, and went west—in fact, on the first transcontinental train into Vancouver of the Canadian Pacific Railway. He once drove into a village where a quack was cracking up Indian root pills, or something unofficial. "Ah!" said the quack to the people, "I see over there a man of education. Sir" (addressing Redmond), "is not this true: *Populus vult decipi?*" And Redmond said, "It is true." "And, Sir, is this not also true: *Decipiatur?*" "Yes, that is true, too," said Redmond. "Now," said the quack, "you see this man of education agrees with me. Can you do better than take my advice?" In British Columbia, when I knew him, he lived in a shack near the naval hospital at Esquimalt, spent the summers in shooting and fishing and the winters in the south.—*Brit. M. J.*, May 24, 1930.

Clinical and Laboratory Notes

A NEW STITCHING DEVICE

BY BASIL THOMPSON, M.D., C.M. (QUEENS),

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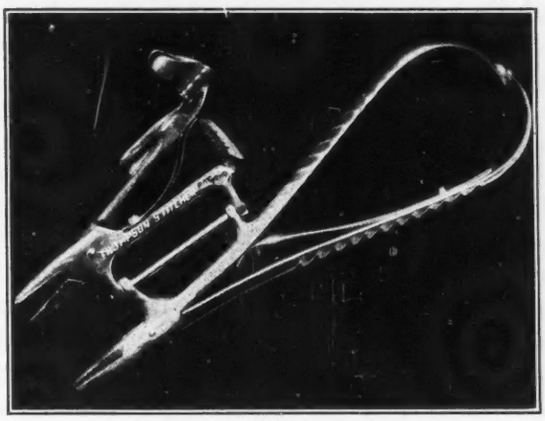
Notwithstanding structural improvements in needle holders, the suturing of traumatic and incisional wounds remains one of the most tedious and tiring processes in surgery.

The object of the suturing device designed by the writer and illustrated here, on which an application for United States Letters Patent has recently been filed, is to facilitate and accelerate the closing of wounds.



A new stitching device.

My invention relates to improvements in forceps for holding and manipulating surgical curved needles; a device consisting of two pairs of surgical needle holders hinged together through their long plane, as shown in the above illustration, and so constructed that the main forceps may be compressed in the fingers of the hand, while the auxiliary shorter forceps may be compressed between the thumb and the palm of the same hand.

A curved needle of the proper dimensions may be inserted into the tissues with the main forceps, following which the point of the needle is grasped by the jaws of the shorter auxiliary forceps, the jaws of the main forceps are released, and the needle is drawn through the tissues by the auxiliary forceps, thus completing the stitch.

Certain advantages of this suturing device are apparent. The mechanics of suturing may be accomplished with one hand, so that the other hand is available for sponging or other necessary acts, and an assistant is unnecessary for rapid operative work. Secondly, in stitching with the improved needle holder, the needle is always held in the jaws of one of the forceps constituting the device, and is thus never free in the tissues, but is always under the control of the operator. Thirdly, in cavity work, as during cervical repair, where only sufficient field exists for one instrument to be used, this device itself completes the manipulations of stitching without its removal from the cavity, with consequent saving in time. Instruments especially adapted to perineal, abdominal, ophthalmic and pharyngeal uses have been designed for these branches of surgery.

PHYSIOLOGICAL ACTION OF INSULIN.—The effect of the intravenous injection of insulin in normal individuals is discussed by K. Roholm, who reports the results obtained in nine men and seven women from 17 to 63 years old. The effect on the fasting gastric secretion was first examined. The amount of gastric secretion, the peptic content, and the total acidity curves corresponded, in that they showed a slight preliminary rise and fall during the first twenty-five to thirty minutes; there was then a marked rise to a maximum in about sixty minutes, followed by a gradual fall. The amount of gastric juice increased, and there was a rise in the content of hydrochloric acid and of pepsin. The blood sugar curve in fasting cases was found to drop for twenty-five to thirty minutes after the injection and then begin to rise, more slowly. The lowest blood sugar value coincided with the start of the gastric secretion. The effect of insulin on the gastric secretion in hyperglycæmia or in normal blood sugar cases, obtained by giving the patient a 50 per cent glucose solution intravenously or through the stomach tube, was next investigated. It was found that the blood sugar concentration determined the gastric secretion. Hyperglycæmia completely inhibited gastric secretion, which, however, promptly began when hypoglycæmic values were reached. Further, it was found that there was a threshold value of blood sugar concentration, 40 to 50 mg. per cent, at which gastric secretion commenced. A further fall in the blood sugar did not appear to affect the gastric secretion, nor did the rate of fall in the blood sugar concentration have any sure influence upon the gastric secretion. Roholm remarks that the nature of the mechanism through which the gastric secretion is induced by hypoglycæmia is uncertain.—*Acta Med. Scand.*, 1930, 472.

Editorial

THE SIGNIFICANCE OF RECOIL FOLLOWING VISCERAL DECOMPRESSION

THE clinical address on "The Significance of Recoil following Visceral Decompression," delivered by Sir William Wheeler at the meeting of the British and Canadian Medical Associations at Winnipeg last August, and appearing in this issue of the *Journal*, is one that will repay careful reading. While not bringing forward any facts that are not already known to the well-trained medical man, Sir William has brought forward a wealth of observation to establish a principle, the importance of which in practice is not always fully realized.

Pressure exerted on any organ or system produces effects that are directly proportional to its amount, the suddenness of its application and its duration. These effects, in the main, are brought about by interference with the circulation, and are evidenced by necrosis, fatty degeneration of cells, atrophy, and the replacement of the parenchyma by fibrous tissue, with, of course, concomitant interference with function. When pressure is exerted suddenly death of the part affected may result, as in strangulated hernia. Slight degrees of pressure may lead to overgrowth of tissue in the case of a hollow viscus, as, for example, the hypertrophy of the bladder associated with prostatic enlargement. When time permits, the organ concerned *adapts* itself to the altered circumstances. But there is more to it than this. Back pressure on the urinary tract, causing dilatation of the renal pelvis, ureter and bladder, invites infection, hence cystitis, pyelitis and pyelonephritis; pressure on a lung, as from pleuritic effusion, will cause emphysema of the other lung, and eventually, perhaps, hypertrophy of the heart. Local disturbances, thus, may produce remote and even systemic effects. Examples might be multiplied, but sufficient has been said to indicate the importance of the subject.

If the application of pressure can be followed by such important results, the release of pressure is not the less to be reckoned with, and it is here that the principle of "recoil," enunciated so convincingly by Sir William meets its practical application. He shows how this principle applies to such diverse organs as the kidneys, bladder, liver, heart, blood vessels, uterus, spinal cord, and eye.

Treatment of pressure conditions should be based not on technical considerations but upon a realization of the general principle applicable to all cases, which is, that pressure which has been exerted slowly must be relieved slowly, and, its corollary, that the more extreme the tension, the more gradual must be its release. It is seldom possible to relieve pressure as slowly as it has arisen, but Sir William points out many cases in which our relief measures might be better adapted to the welfare of the patient. The sudden release of pressure is always risky and may be disastrous. The sudden death of patients after such procedures as catheterization, paracentesis, and spinal puncture points the moral. A particularly good example that could be adduced is the case of pleural empyema, where too sudden release of pressure may be followed by œdema of the lung and "flapping mediastinum," or even death. In the case of a strangulated hernia the pressure of the constricting ring must, of course, be relieved promptly if gangrene and death are to be prevented, but in other forms of intestinal obstruction surgeons may well consider whether their technique may not be improved. Sir William points out that the common practice of passing a tube into the bowel for the purpose of emptying distended coils is dangerous in direct proportion to its efficiency, and he thinks that cases of obstruction do better when a slow steady drainage can be established through a small tube. In the case of high blood pressure, the measures adopted should be

those that act gradually. Drugs which produce a sudden reduction would probably do more harm than good. Here we are reminded of Sir James Mackenzie's dictum that if there is high blood pressure in any given case it is necessary for the purpose of maintaining an efficient circulation. It follows that drastic reduction of the pressure, if that be possible, is likely to be most injudicious. Sir William Wheeler would endorse this.

The mechanism at work in connection with pressure and recoil seems to be this. Direct pressure, combined with reflex vasoconstriction, closes some of the capillaries, thereby causing a decreased supply of blood, with varying degrees of cell degeneration, and diminished function. On the sudden release of pressure the capillaries expand, and, with the removal of the vasoconstrictor reflex, the arterioles dilate, flooding the organ with blood. Stagnation of blood, cellular and tissue œdema, and collapse of function are the result. In fact, the organ suffers again from pressure, this time suddenly applied, and being already damaged, cannot recover. A good illustration of this is the uræmia that sometimes follows the rapid drainage of a dilated bladder or kidney.

Sir William Wheeler's address is timely, since it calls to mind and emphasizes facts which, readily enough admitted, are in danger of being forgotten in everyday practice. A.G.N.

THE PATHOGENESIS OF MILIARY TUBERCULOSIS AND TUBERCULOUS MENINGITIS

THE traditional manner in which miliary tuberculosis is supposed to be produced is by the sudden rupture of a tuberculous focus into a large blood or lymph vessel. Thus at autopsy search is always made for some rupture into either the thoracic duct on into a large vein or artery, usually unsuccessfully. Rich and McCordock* from their considerable autopsy material consider that miliary tuberculosis, perhaps more than any other type of septicæmia, is the result of repeated discharges of bacilli from many foci which are commonly microscopic in size. This they found to be the case in 20 out of 46 cases in which only one section of lung was studied. It is also a self-propagating septicæmia. Nor is the theory of successive "showers" of bacilli necessary to explain the graduated size of individual tubercles in cases of miliary tuberculosis, since they have produced this same picture experimentally by a single inoculation; the varying sizes of the tubercles are apparently due more to the actual number of bacilli lodging in a given site.

Turning next to the pathogenesis of tuberculous meningitis these authors proceed to question the accepted idea that tuberculous meningitis is usually the result of a septicæmia and from their own experience believe that it is far more frequently caused by the rupture of localised caseous tubercules in the brain or cord directly into the subarachnoid space. Their numerous arguments in favour of this idea are very convincing. To begin with, pathologically, the lesions of diffuse exudative tuberculous meningitis are typical of the exudative necrotic form of reaction which occurs in an allergic animal after inoculation with a large number of bacilli. This latter condition cannot be duplicated experimentally, using the intravascular type of inoculation. It is relatively easy to produce tuberculous meningitis experimentally by direct inoculation of tubercle bacilli into the cisterna magna, but no one has ever succeeded in producing this lesion as a direct result of inoculation of bacilli into the carotid artery, even in allergic animals. What happens in this case is that a generalised tuberculosis occurs with tubercles in the meninges as well as in other organs of the body. Acute illness and death however do not rapidly supervene. When the animals die a certain small number may show evidence of tuberculous meningitis, but in these cases one can usually demonstrate tubercles in the substance of the brain or spinal cord contiguous to the surface. In their human cases Rich and

* Rich and McCordock, *Johns Hopkins Hosp. Bull.*, 1929, **44**: 273.

McCordock were able to demonstrate old localised caseous tubercles in 36 out of 40 brains from cases of tuberculous meningitis, and they think that had the spinal cords been as carefully sectioned the number would have been increased. Further arguments used are, that there are many cases of extreme generalised miliary tuberculosis without meningitis, that they found tuberculous foci in the brain in 95 per cent of cases of progressive visceral tuberculosis, that the age and character of the miliary tubercles in the viscera in generalised miliary tuberculosis with meningitis bear no constant relation to the age or character of the meningitis, and, finally, that the vascular lesions which supposedly constitute evidence for the vascular route of infection also occur in meningitis without miliary tuberculosis and in experimental tuberculous meningitis when the inoculation is made directly into the subarachnoid space.

The pathogenesis of tuberculous meningitis is thus like that of pleurisy or peritonitis and due to the discharge of a localised tuberculous focus directly into the meninges of an allergic body.

ARNOLD BRANCH

THE REPORT OF THE ROYAL COMMISSION ON PUBLIC WELFARE

THE report of the Royal Commissioners which was submitted to the Ontario government following an exhaustive study of the hospitals, homes, orphanages and corrective institutions has been available for several months now and has been the topic of much consideration and discussion. There is no doubt but that the Ontario government has made an honest effort to get the fullest information on these problems and certain sweeping suggestions indicate that forthcoming legislation, if based upon the recommendations of the report, should mark a distinct milestone in social legislation. The main provisions of this report appeared in the October issue of this *Journal*, but a number of the suggestions which have aroused nation-wide interest are worthy of comment.

From the hospital viewpoint, the outstanding suggestion is that the non-paying patient should be a complete charge on public funds. This principle, the Commissioners state "should be frankly and fully recognized and adopted." If this be done, this province will establish a condition for which the hospitals throughout Canada have been striving for years, a precedent which may assist other provinces to adopt the same principle. At the present time no province through its municipal and provincial grants meets the cost of the care of indigents, a burden now borne in part by the private patient.

One welcomes also the suggestion that, when motor accident victims receive hospital care, the claim of the hospital shall be a statutory lien upon any damages that may be recovered by the patient and upon any accident insurance paid. This is a wise recommendation, for the amount of the claims lost by hospitals in connection with motor accidents is staggering. One would like to have seen the medical accounts included in this statutory lien, for the surgeon is a co-sufferer in this respect, but this suggestion may have been beyond the purview of the commission.

The recommendation that government and municipal grants be paid for babies born in the hospital is commendable. Hitherto this has not been done, despite the fact that the baby as a rule requires more nursing and general care than does the mother. This should assist to some extent at least in the laudable efforts to reduce the cost of maternity care. The Commissioners state definitely that "maternity costs in the hospitals are high," but as public hospitals practically never make a profit, costs can be reduced by increased subsidy only.

Roentgenologists will be interested in the comment that "the charges made for x-ray treatment are much higher than the cost calls for." The Commissioners go so far as to recommend that if the auditors find an unduly large profit made from any particular department of hospital service that the government grant to the hospital be withdrawn until the condition is remedied. One

would be of the opinion that this matter should be considered in conjunction with the general financial position of the hospital. The majority of small hospitals lose money on their x-ray departments; the larger urban hospitals, with a large turnover of private and outside patients, may make profit on this department, but these large hospitals incur huge deficits on their disproportionately large public and outpatient services, and the profits from the roentgenological department are needed to balance this deficit. If the cost of the public and outpatient service can be fully met from public funds, as recommended, then it will be possible to provide roentgenological and private ward accommodation at a much more reasonable rate, but not otherwise.

"Ontario.....has done little about cancer." The Royal Commission is of the opinion that active steps must be taken to combat this scourge. It is recommended that the medical societies be consulted concerning possible improvement of the conditions for the diagnosis and treatment of cancer in the chief general hospitals of the province. The establishment of a special provincial hospital for the study of cancer is suggested. An alternative suggestion advanced is that special hospital units for cancer treatment be established in connection with the hospital services operated in conjunction with the medical faculties of the University of Toronto, of Queen's University, and of the University of Western Ontario. The recommendation is made that the province purchase radium to be available for cancer treatment. The suggestion is made that three grams be purchased, part of this amount being set aside for emanation production.

These two suggestions, if acted upon, will mark a long forward step in our combat with this disease. The question of whether to establish a special cancer hospital or to develop existing hospital facilities will require careful thought. Centralization of research and treatment in one special hospital has many advantages, as evidenced by the excellent results obtained in the Radiumhemmet in Sweden. This desideratum might be obtained with less overhead and with greater utilization of existing research facilities by establishing a special cancer department in some properly equipped general hospital. And the establishment of cancer services in various teaching centres might bring still more patients under observation, and might be of more educational value to graduating students and the public.

Beyond the preliminary announcement last September, by former Premier Ferguson that the government proposed spending half a million dollars on a radium institute, no governmental policy concerning the purchase of radium by the state has been announced. It is anticipated that any cancer research development and any provincial purchase of radium will be considered together. Pending this decision, the proposed establishment of a Radiological-Therapeutic Institute by the Toronto General Hospital, as previously announced, has been postponed.

Those medical men interested in the crippled child will be pleased with the sweeping recommendations made for his care. There should be a Branch for Handicapped Children in one of the government departments which would establish district clinics, which would arrange for annual surveys, which would link up existing organizations, provide treatment and supply funds if necessary. School Boards should supply transportation, special seats, and even lodging close to the school. Compulsory notification of physical defects on birth certificates is recommended. This Branch should provide vocational training, in special schools if necessary, and should undertake placement in suitable employment.

The creation of a Public Welfare Department under a Cabinet Minister was one of the noteworthy recommendations of this Commission. It was pointed out that such a Department would strengthen and correlate the government supervision of the various social and corrective institutions and agencies.

This Department of Public Welfare has been created already under the able direction of the Honourable W. G. Martin. Among other interests, he has been charged with the Mothers' Allowance, Child Welfare, Soldiers' Aid, Old Age Pensions, Infants' Homes and Childrens' Aid. Within the last few weeks a home has been purchased in Toronto for the follow-up of boys from the Bowmanville school. This will function as

a club house and as a home during unemployment, and should prove a valuable adjunct to this work.

Just prior to the publication of the report Dr. J. M. Robb, of Blind River, was appointed Minister of Health. In the last few months he has made a very thorough study of the medical and hospital needs of the province, and has made considerable effort to obtain first hand information on the views and opinions of his colleagues in the medical profession. Hospitals, formerly under the Provincial Secretary, were transferred to the Department of Health, and it was announced early in October that Dr B. T. McGhie, who had been given oversight over the mental hospitals, would exercise jurisdiction over the general hospitals as well. Both of these medical men have shown the keenest enthusiasm in their new responsibilities and already, on many occasions, have shown a laudable desire to cooperate fully with the medical and hospital organizations.

This report has been received with very favourable comments. If acted upon, it is thought that these recommendations should correct many of the unsatisfactory arrangements existing today. On some points the report is not as clear as it might be, possibly because of the indefinite use of certain terms, but these are details which do not affect the main text. It is hoped that a new Hospitals Act will be brought down at the next session of the legislature, but it is possible, owing to the change of personnel in the Cabinet and the need for careful consideration of so many details that sufficient time will not be available before the opening of the House. G. H. AGNEW.

Editorial Comments

The Ketogenic Diet in Epilepsy

In a paper presented at the last meeting of the American Medical Association, Helmholz and Keith[1] of the Mayo clinic, report on the value of the ketogenic diet in the treatment of idiopathic epilepsy. Nine years have elapsed since its introduction at this clinic by Wilder, in 1921; since then until April 1, 1930, this treatment has been prescribed for 272 children. Included in this number were 29 cases of symptomatic epilepsy. In these, although early results were promising, only two were permanently freed from attacks. Excluding these 29 and 72 who failed to cooperate and could not be kept in a condition of ketosis, 171 patients form the basis of this report.

Of these, 141 have been on the diet for more than a year, and 30 for less than a year. In the first group of 141, 43 have remained free from attacks 1 to 7 years. The writers state that in their experience, if patients remain free of attacks from 9 months to a year it is exceptional for attacks to recur when the children gradually resume a diet not absolutely ketogenic but still low in carbohydrates and high in fat. If the attacks do recur, a return to the ketogenic diet for a short time again checks their development.

Thirty-two patients of the 141 showed definite improvement, both in general demeanour and in the reduction of the number and severity of the attacks, but they were not entirely freed from them. The improvement, however, was so great that the parents considered that more had been accomplished by the diet than by any previous treatment. In the remaining 66 patients, the treatment failed to effect any improvement. In the group of 30 patients under observation for less than a year, 11 were freed from attacks, 13 appear definitely improved, and in 6 the treatment failed. Before the diet was tried, most of these patients had been on a regimen in which phenobarbital was used to control the convulsions. The writers state that in a certain percentage of cases they found the addition of phenobarbital to the diet prevented attacks, when neither the diet alone nor the phenobarbital alone controlled them.

Although dehydration may have some value in the control of convulsions, it proved of little value in comparison with a ketogenic diet. It had little if any effect on the seizures of petit mal, whereas the diet appeared to have a very definite influence, and some of the most striking results have been in this type of case. Furthermore, several of the patients, who were entirely freed from attacks after they were placed on the diet, drank freely of water without interfering in any way with the effect of the diet on the convulsive seizures. Several patients from whom water was withdrawn to the point of hyperthermia were not freed from attacks. One patient was later placed on the ketogenic diet

1. *J. Am. M. Ass.*, 1930, **95**: 707.

and was entirely free from attacks for a number of months.

In the discussion which followed the reading of the paper, Dr. Crothers, of Boston, emphasized the importance of considering carefully the psychological and psychiatric implications in each individual. Dr. Lucas, of San Francisco, emphasized the importance of cooperation in this treatment by the family, who should have an intelligent appreciation of the problem. He corroborated the fact that by adding phenobarbital to the ketogenic diet, better results may be obtained than by either treatment used alone. Dr. Helmholz in closing the discussion, said that they did not take any of their patients into the hospital; they considered it more important for the patient to remain with the mother or caretaker, but it was extremely important that whoever was to look after the child should master the technique of the preparation of its food. He also called attention to the fact that when children are placed on the diet and ketosis becomes evident, they complained for some days of being sleepy. This appears to be a definite effect of the ketone bodies.

A. D. B.

New Diplomas in Obstetrics

In view of the regretably high maternal mortality in connection with childbirth in Great Britain, Canada, and the United States, as compared with that in certain European countries, much study of the matter has been going on during the last year or two, and it is evident that determined efforts are being made to improve the situation. One of the signs of the times is the institution by various reputable bodies of diplomas in obstetrics for medical practitioners. The British College of Obstetricians and Gynæcologists, which was founded last year, has power, either independently or conjointly with authorized teaching and examining bodies, to grant to registered practitioners special recognition of advanced knowledge in obstetrics and gynæcology. The Royal Colleges of Physicians and Surgeons (Conjoint Examining Board) in England this year has issued regulations for a new diploma in these subjects, and the Society of Apothecaries of London has recently instituted a Mastery in Midwifery. The latest body to take similar action is the American Board of Obstetrics and Gynæcology, which was formally constituted in Niagara Falls, N.Y., in September of last year.

It is to be hoped that this official recognition of advanced standing in obstetrics and gynæcology may be an inducement to the practitioner in these various countries to increase his obstetrical experience and perfect his technique. This is not to imply that the medical man is solely, or even mainly, to blame for an undesirable state of affairs. He is only one factor in a complicated problem, but it is hoped that the institution of these new diplomas will result in the appearance of a large number of highly trained specialists in obstetrics. We would respectfully suggest that the establishment of a similar diploma for Canada might be properly taken up in due course by the new Royal College of Physicians and Surgeons of Canada. We should not be behindhand in this particular.

A. G. N.

The Pursuit of Health

The popular address of the distinguished English physician, Dr. Robert Hutchison, which he delivered last August at Winnipeg at the meeting of the British and Canadian Medical Asociations, entitled "The Pursuit of Health," has attracted much attention and some adverse comment. Dr. Hutchison evidently believes in the counsel—*Audi alteram partem*. Whether one is disposed or not to follow him relentlessly to his conclusions, it cannot be denied that he has placed before us some aspects of the subject of health and its maintenance that are apt to be overlooked, and has done it in his own characteristic hearable, readable, and arresting fashion. That many of the statements put forward are exaggerated, to put point on the arrows, so to speak, Dr. Hutchison would probably be the first to acknowledge. If reformers, including those concerned with health propaganda, have gone to extremes, as the lecturer would seem to imply, it would not be surprising to find the reactionary doing the same thing. On this side of the water we are apt, perhaps, to take our ideas too seriously and drive them to a too logical conclusion. If so, we have here the corrective. Our only hesitation would be whether it was wise to jostle our idols before an audience so largely lay. The lay press seized upon the points with avidity, so that perhaps we are in need of a counter-corrective.

Most medical men will be in accord with Dr. Hutchison when he scores fads and fancies. Diet and exercise, in particular, have become entangled in a web of pseudo-science, and we have much need here for sanity. Dr. Hutchison would agree with the dictum of that wise old thinker, Shakespeare, when he said,—"Let good digestion wait on appetite and health on both."

With regard to the so-called "diseases of childhood," and their inevitableness we must disagree. That such diseases are still prevalent is a reproach to our profession, but surely they are not necessary and inescapable; to argue otherwise implies a reprehensible fatalistic attitude. We must do better than this.

Undoubtedly, too, it is true that "health consciousness" may breed "health anxiety," but it is arguable whether the danger is so great as to

warrant a cessation of efforts for health betterment. While we admit the occasional case of individual and vicarious hypochondriasis, we, in Canada, do not feel that there is any danger at present of national hypochondriasis. Dr. Hutchison touched us on a tender spot when he paid his respects to the periodic health examination, which is one of the Canadian Medical Association babies, but other arguments that could be advanced against this scheme are much more cogent than the possibility of creating a nation of hypochondriacs. However, as he admits, he is giving his personal views in this connection, and many of his professional colleagues, whose opinions he values, do not agree with him. Here Dr. Hutchison is in no way speaking for his country and profession. It is undoubtedly arguable whether mere length of days is a pure blessing. Much depends, in fact, on how we spend our days.

Dr. Hutchison ends his address with the statement that moderation is the universal secret of health. Undoubtedly, but how many live up to, or can live up to, this counsel of perfection? On the one hand we have the sybarite, the gluttonous man and the wine-bibber, and on the other the under-privileged. The former we can only advise; the latter must be advised and materially assisted, dieted, among other things. "The country's greatest asset is not health, but character." If we have "character," all things, including health, will be added to us. True again, but does not health influence the development of character? Ian MacLaren said in one of his books that a certain number of tea-dinners would make a man a Plymouth Brother. Much philosophy is contained in that witticism. But read Dr. Hutchison in this issue.

A. G. N.

The Medical Survey

The survey of medical practice in Canada instituted by the Canadian Medical Association is reported elsewhere in this issue. Through it the Association has had an unusual opportunity to gain first-hand information concerning the actual conditions under which our members practise, and we hope that the wealth of information which is now on file will prove useful on future occasions.

The replies received indicated that the writers had given serious thought to the many problems of practice confronting them, and their comments have been carefully noted. Many of the hundreds of replies received were quite lengthy, some running into many pages; one letter, written in French, was eight pages in length. It is a temptation indeed to select quotations from many of these letters, as the writers frequently epitomized various phases of the problems of practice in a well worded paragraph or sentence. However, as this is primarily a statistical study, it was decided that expressed opinions, even if of the highest value, should not be featured in this published report. Furthermore, it was realized that many of these comments, when taken from their setting, might be misinterpreted, especially by those irregular critics of the medical profession and our medical schools who seek to distort in order to support their own peculiar views.

Among other interesting findings, the report reveals that the young doctors are not all flocking to the cities; that village and town doctors have the greatest population from which to draw patronage; that Canada has the second highest number of doctors in relation to the population; that two out of fifteen of the doctors replying did not consider that they were making a fair living a year ago; that consultation service in the rural areas is not satisfactory; that the lack of laboratory and x-ray facilities is a matter of concern in rural areas; and that but 7.1 per cent of patients seeing general practitioners require treatment by specialists.

Medical education proved to be an unusually stimulating topic. Many and varied were the comments received, and a synopsis of their portent is included in the report. As this portion of the survey may prove of special interest to medical educators, a more detailed report of this section is being forwarded to each medical school. The zeal for knowledge which is a characteristic of the Canadian graduate is attested by the fact that 81.5 per cent of the doctors replying have taken post-graduate courses. Of this record, which excludes the shorter courses or the extra-mural lectures, Canada may well be proud.

G. H. AGNEW

The Banting Research Foundation

Elsewhere in this issue will be found a brief statement of the activities of the Banting Research Foundation for the past year which makes gratifying reading. This Foundation, we believe, is the only organization which is concerned with encouraging and financially supporting research in Medicine and allied subjects throughout the Dominion, on broad and liberal lines. The only other Canadian institution which it resembles is the Research Council of Canada, but the scientific studies fostered by this latter important body are concerned with industrial, rather than medical, problems. It will readily be admitted, on reading the list of studies that have already been concluded and those that are still under consideration, that the Banting Foundation has made a splendid begin-

ning. To Dr. Velyien E. Henderson we are indebted for the following statement.

The Banting Research Foundation was founded by certain prominent Canadians, amongst whom Sir William Mulock and Mr. E. R. Wood were the moving spirits. There was raised in 1925 a capital sum which now amounts to something over $600,000. It was understood that the income only of such fund should be expended, and that the management of this expenditure should be vested in a Board of Trustees. The Board at this moment consists of Sir Robert Falconer, Chairman; Rev. Canon Cody; Sir William Mulock; Mr. C. S. Macdonald, President of the Confederation Life; Dr. W. E. Gallie; Mr. J. W. Rogers; Prof. J. G. FitzGerald; and Profs. D. T. Fraser and V. E. Henderson, Honorary Secretary-Treasurers.

Under the terms of the Charter, a portion of the income is to go to the support of research work carried on in the Banting and Best Chair of Medical Research, while the remainder is to be dispersed in grants to such persons as propose problems of medical research. The grants may take the form of living expenses for the worker, or for supplies or apparatus needed in carrying out the investigation of the problems. Applications are considered by the Trustees of the Foundation, and, should they be in any doubt in regard to the same, they are referred to an Advisory Committee, which contains representatives of Toronto, McGill (Professors Collip and Meakins), Montreal, Alberta, Queens and Dalhousie. To this Committee, such applications are referred for advice.

Though the Foundation prefers to see the pieces of work carried out in the universities and university hospitals, grants have been made to individual workers in non-university centres, when the Trustees are convinced that the facilities are such as to enable them to carry on the work they propose satisfactorily.

Application forms can be obtained at any time from Dr. Velyien E. Henderson, Department of Pharmacology, Toronto University, and these are dealt with in the order in which they are received.

The Banting Research Foundation cannot fail to be of immense value in promoting medical research, and it is pleasing to know that its benefits are available for the whole of Canada. Its existence augurs well for the future.

A. G. N.

President A. Stanley Mackenzie

The announcement that Dr. A. Stanley Mackenzie is to retire from the presidency of Dalhousie University at the expiration of the present academic year has occasioned intense regret throughout Nova Scotia and, in fact, wherever there are Dalhousians. Under Dr. Mackenzie's administration, Dalhousie has progressed by leaps and bounds. The splendid group of buildings on the Studley campus and the new buildings on the medical campus constitute a permanent monument to his untiring activity and devotion to the interests of the University. During the twenty years of his presidency the student body has more than doubled, while the money available for University purposes has increased nearly sevenfold. By no means the least of Dr. Mackenzie's achievements is the reformation which has come about in the medical school, in which he has shown the most whole-hearted interest. At the commencement of his regime, the outlook for the medical school was by no means encouraging, but under his wise and forceful administration it has been built up steadily and is now a source of real pride to the University. All that Dr. Mackenzie has done for Dalhousie has been very well done by a good and faithful servant, and he will carry into his retirement the well earned gratitude and esteem of all who know of his splendid achievements.

W. H. H.

The Physician's Prayer

On page 2 of this issue we reprint, from the pages of our esteemed contemporary, *The Journal of the Medical Association of South Africa,* the Physician's Prayer of Maimonides, which for sheer loftiness of sentiment may well take its place beside the better known Oath of Hippocrates.

Mûsá ibn Maymûn, called Maimonides, was a famous Jewish scholar of the twelfth century, who lived in Cordova. He was one of the great triumvirate, with Ibn Rushd (Averroes), also of Cordova, and Ibn Zuhr (Avenzoar), of Seville, who upheld the lamp of Arabian medical learning in the western world. He eventually became court physician in Egypt of that picturesque figure, the great Saladin.

As the Arabians at the time were the only custodians of the ancient Greek learning, it may well be that Maimonides was familiar with the Hippocratic tradition and practice, and that this tinctured his own conception of the medical profession. The prayer expresses the aspirations of a young physician just beginning the practice of his art—sincerity, love of man, humility, and trust in God, and is a truly remarkable relic of the early Middle Ages.

A. G. N.

The Place of Meeting

Through the courtesy of Dr. Ross Mitchell, of Winnipeg, the editor of the *Manitoba Bulletin,* and the *Journal's* representative in Manitoba, we have received a pamphlet of

pleasing appearance entitled "The Place of Meeting," which is a reprint of various articles relating to Manitoba and Winnipeg that appeared in the *British Medical Journal* and the *Canadian Medical Association Journal* in preparation for the great meeting in Winnipeg last August. Seven articles appear:—"An Adventure across Canada in 1930," by D. A. Stewart; "A Historical Sketch of Manitoba," by Ross Mitchell; "Manitoba's Educational Institutions," by Ross Mitchell; "Winnipeg—Its Early History and Industrial Development," by Percy G. Bell and Steina Sommerville; "Hospitals and Nursing Missions of Greater Winnipeg," by Ross Mitchell; "Lower Fort Garry," by Percy G. Bell; and "Travelling in Canada," by Hilda Hesson. The publication has a number of interesting illustrations relating to the Prairie Province, and is prefaced by a portrait of Dr. A. D. Blackader, Montreal, "whose enthusiasm, inspiration and generosity made this work possible." On the inside of the back cover is a sketch map of Manitoba showing the increments of its territory since 1870. A pleasing verse, from the pen of A. J. Campbell, Winnipeg, garnishes the production:—

> "The prairie's cenotaphs, raised to the corn
> That needs must die before it could give life;
> Not empty shrines, but filled with sunset toil,
> Dawn's high emprise, and nation's sustenance,
> Man's altars to the plains' eternities."

Altogether, a happy idea and a memento of the great event of last August that will be appreciated by all who possess it.

A. G. N.

On to Vancouver

We must begin to think of the Annual Meeting of the Association, which convenes this year in Vancouver. The local publicity committee, of which Dr. D. E. H. Cleveland is chairman and Dr. W. J. Dorrance is secretary, has shown commendable promptitude in getting to work, and in this issue, under "Association Notes," will be found the first of a series of historical articles dealing with the great city and province of the west. In view of the extra effort put out last August and the very special nature of the gathering, there may be a tendency to relax, and, to an equivalent extent, the Vancouver meeting may come short. There is that danger. Let us see to it that we all, and particularly those of us who live in the east, support our western brethren. Let it never be said of Canada, as Kipling said of a hemisphere, "East is East, and West is West, and never the twain shall meet." Let us make sure that we do meet. Of this we may be sure; the local committees will do their work thoroughly well. It is for the rest of us to attend in force and assist in making the Vancouver Meeting notable in the annals of the Association.

A. G. N.

Royal College of Physicians and Surgeons of Canada

We desire to draw special attention to the accompanying notice which emanates from the Royal College of Physicians and Surgeons of Canada. It is most important that the profession should know that there are a certain number of vacancies in the Fellowship which it is competent for the College to fill and that the applications under the Act must be in hand before June 14, 1931.

"The Royal College of Physicians and Surgeons of Canada desires to draw to the attention of the physicians and surgeons of Canada, Section 5 of the Act of Incorporation of the College, which Section reads as follows:—

> "The Council may, at any time within two years after the coming into force of this Act and without examination, select and admit as Fellows any duly qualified persons domiciled in Canada who have in their opinion given evidence of high ability in one or more departments of medicine." (Act assented to and in force June 14, 1929.)

"Members of the profession who consider themselves as qualified for admission to Fellowship under this Section of the Act, are invited to apply for qualification forms to Dr. T. C. Routley, Registrar-Secretary of the College, 184 College Street, Toronto."

SUBCUTANEOUS NODULES IN RHEUMATOID (CHRONIC INFECTIOUS) ARTHRITIS. — Subcutaneous nodules have been observed by M. H. Dawson and R. H. Boots in forty patients. Approximately 200 patients with true rheumatoid arthritis have been seen during the period of analysis, so that the incidence of patients with nodules is relatively high—approximately 20 per cent. The nodules have been observed only in cases of typical rheumatoid arthritis and in one case of Still's disease. They have never been recognized in cases of osteo- (hypertrophic, degenerative) arthritis. Three of the patients in whom the nodules occurred presented a history of a previous attack of rheumatic fever. Four patients showed definite evidence of rheumatic heart involvement. In one patient the development of arthritis and the appearance of nodules appeared to bear a definite relationship to a previous attack of scarlet fever. This study sustains the following conclusions: (1) The subcutaneous nodule occurring in rheumatoid arthritis is a classic lesion of this disease. (2) The histologic appearance of these nodules is uniform and highly characteristic. (3) There is a striking histologic resemblance between the subcutaneous nodules occurring in rheumatic fever and those observed in rheumatoid arthritis.—*J. Am. M. Ass.*, Dec. 20, 1930.

Special Articles

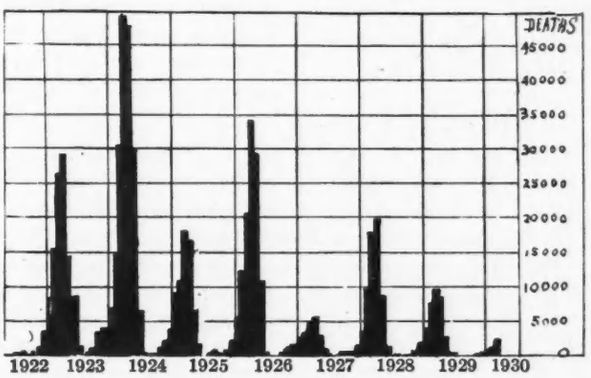
THE DECLINE IN PLAGUE

BY H. E. MACDERMOT, M.D.

Montreal

Plague is one of the diseases which is disappearing from civilized countries. There is little difficulty in explaining this, for it is, fortunately, one of those diseases with a well understood natural history which provides a convenient point of attack. This has been taken full advantage of by public health authorities wherever modern methods can be applied. A birdseye view of what has been accomplished is furnished in one of the excellent reports from the League of Nations,* in which the plague situation throughout the world is reviewed.

The most remarkable accomplishment perhaps has been in Northern India, a region which has so far provided a greater number of cases than all the rest of the world combined. The improvement of the situation there has been steady since 1924, as will be seen by the following chart. In that year there were 251, 261 deaths



Deaths from plague in Northern India, from 1922 to 1930. (Modified from Epidemiological Report of the League of Nations, May 15, 1930.

from plague in the Punjab, whilst during the first four months of 1930 there were only 250 deaths. This is the more remarkable because these months included the season of high prevalence, the winter rains were of unusual volume, and the prospects were for an increase rather than otherwise.

There can be little doubt that the improvement has been due to the active measures of sanitation which have been enforced in recent years. Chief of these measures has been the destruction of rats, especially from August and on, during the season when plague is not prevalent. This rat destruction is repeated monthly, to stamp out infection in the potential endemic foci, which are considered to embrace all the villages in which plague cases or rat mortality occur after June 1st, and all villages within a radius of five miles of these, as well as all large towns, especially important grain markets, with a bad history. Hydrocyanic gas has been used with success for killing the rats in the villages. Anti-plague inoculations have also been carried out on a large scale in the infected areas.

A similarly striking improvement has occurred in the ports. Only Bombay and Rangoon are now infected, but even in these cities the incidence of plague is greatly reduced. The number of infected rats is somewhat higher than last year, but this might be due to a larger number being examined. In comparison with earlier years the degree of infection amongst the rats has greatly diminished.

What has been done in India has been repeated on a smaller scale in various other parts of the world. There are one or two regions, however, where the disease has shown fresh activity. A recrudescence has been reported in certain centres in the north of Africa, which are of particular interest because of their proximity to Mediterranean trade routes and to Europe. Plague reappeared in Morocco in March 1929, and there was an outbreak in Tunis in December of that year.

Egypt, like India, has shown a great decrease in plague, although, curiously enough, it has never been such a problem as it has been in India, in spite of the fact that every province is infected, and also that a large part of the rural population lives under very primitive conditions. The coast of the Red Sea has been free from the disease for many years, and the same story of its wane and in some instances complete disappearance is told in several other areas of Africa. In the Union of South Africa, it has been mostly confined to the interior, within limited areas.

As regards the Western hemisphere, it is in the countries of South America that the greatest number of cases have always occurred, and here again there has been a great and steady decline. In Ecuador, for example, serious epidemics took place till about 12 years ago. Then extensive rat examination and other preventive measures began to have their effect. In the first part of 1930 in the city of Guayaquil, only 6 cases and 4 deaths were reported up to March 15th, which is the lowest figure on record for any corresponding period since the introduction of plague into the town.

Peru has had plague since 1903, when it was introduced into Callao. In recent years there has been a steady diminution in the number of cases. In Chile, there was a considerable amount of plague for some years before the war, and then the disease gradually disappeared alto-

* Epidem. Rep., May 15, 1930.

gether. In the Argentine Republic there have been frequent sporadic cases, but never any serious epidemics. But the existence of plague at the various ports is especially important in view of the large export trade in grain. The statistics are not very complete for this region, but on the whole there seems to be some improvement in the situation. Both in Uruguay and Brazil there is a great lessening in plague.

No human plague case has occurred in the United States since 1928, although infection amongst ground squirrels continues in certain inland districts in California. Five cases were reported in Hawaii from June to August 1929, but none since then.

In China, plague is now of little importance in the ports, although outbreaks occur from time to time in various inland localities. In Japan, the last serious outbreak of any importance took place in 1922. No human case has been reported since 1926, and rat infection only exists at one point, namely, Osaka. This was probably introduced by incoming steamers.

Very few plague centres now remain in Europe. The disease has practically disappeared from the Near East, apart from Egypt, and only a few centres of infection remain in Iraq. Beirut has been free from plague since November 1929, when a single case was reported. This is a marked improvement over earlier years, when several ports of the Eastern Mediterranean were frequently infected. An endemic centre persists in the Azores Islands, where 20 cases were reported in January 1930, in the island of St. Michel.

THE TOXÆMIAS OF PREGNANCY*

AN EXTRAMURAL LECTURE

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Under the heading of "Toxæmias of Pregnancy" have been grouped many conditions which have but one thing in common, namely, a pregnancy with an associated toxic state. It is only in the very recent years that an endeavour has been made to divide scientifically this large group into its component parts.

Firstly, we must realize that every pregnant woman is a toxic woman, that she possesses great potentiality for developing pathological states. Our only hope of coping with the disastrous results of this toxæmia lies in close ante-natal observation and recognition of incipient pathological states. Early recognition of the incipient stages is of the utmost importance, and response to treatment is almost proportional to promptness in its application.

The origin of the poisons of pregnancy is not known, and the many theories bearing upon the subject only prove our ignorance of the subject.

For convenience of treatment it will be well to adhere to the time-honoured subdivision of toxæmias into those of the first half and those of the second half of the pregnancy. According to some, this is a purely arbitrary subdivision, but it is my opinion that it is based upon sound clinical observation.

TOXÆMIAS OF THE FIRST HALF OF PREGNANCY

Here let us deal with debatable matters.

Clinicians divide the cases into true toxæmias of pregnancy, and neurotic vomiting of pregnancy. It is doubtful whether this subdivision serves any very useful purpose. It is doubtful whether even a true toxæmia of pregnancy without an element of neurosis superadded ever exists in the human race; and it is equally doubtful whether true neurotic vomiting of pregnancy occurs without a basic element of toxæmia. Therefore, it becomes our duty not to place any given case in either of these two categories, but rather to determine the relative proportions of both these factors. It is not easy, except after prolonged observation, to determine how much of the vomiting is neurotic and how much of it is toxic. But the great frequency with which patients cease to vomit immediately upon being transferred to a hospital environment has led certain authorities to deny that there is such a thing as a true toxæmia of early pregnancy. There can be no doubt that the neurotic element is large in nearly every case, if not in all. I have been struck with the frequency with which one finds complete freedom from the so-called symptoms of toxæmia in elderly primiparæ who have waited long for the gratification of maternal yearning. The mental satisfaction of accomplishment seems to be the dominant force here. Upon first thought this would seem to be a severe blow to the toxæmic theory. But upon second thought it only confirms the hypothesis that mental states modify symptoms.

Once the initial symptoms have set in there is no limit to which the superadded acidosis of starvation may not progress. Vomiting (neurotic or toxæmic) produces starvation, which in turn leads to acidosis. This acidosis leads to further vomiting, starvation and greater acidosis, and so the vicious circle goes from bad to worse. This must be broken before the patient can recover; otherwise, the end is acute yellow atrophy of the liver and death.

What do we know clinically about the toxæmia of pregnancy? Nothing, except its

* Received for publication on December 2, 1929.

close resemblance to the action of certain abnormal or therapeutic agents. Certain chemical or metabolic elaborations choose certain paths for their elimination from the body, and the degree of concentration of these will determine the degree of irritation produced upon the specific organ of elimination. Kidney function hardly comes into question in the cases of toxæmia of the first half of pregnancy. The toxæmia spends its noxious results upon the alimentary canal.

Now the foregoing facts suggest the treatment. In the milder cases do not allow the stomach to be empty for long intervals. Food should be taken every two or three hours by day and a light form of food upon retiring, and a certain agreeable dietary should be available to be taken through the night should the patient awaken; all this for the purpose of activating peristalsis and the propulsion of the poisons along the alimentary tract for elimination. Mild cathartics at bed time materially assist, and the ingestion of large quantities of fluid, preferably water, will further assist.

When the vomiting persists a new disturbing element is brought into the clinical picture. This is acidosis. The susceptibility of individuals to acidosis differs very markedly. One sees this after operations. Some will develop acidosis after the slightest narcosis, whereas others never show the slightest tendency to acidosis under the most provocative influences. It is impossible to offer an adequate explanation for this except idiosyncrasy—a term which covers much ignorance. Overindulgences, sedentary life, mental activities, physical exertions—none of these seem to be determining factors. When acidosis becomes a factor, the vicious circle described above becomes dominant. There is nothing so effective as intravenous glucose saline. The most efficient concentration and dose I have found to be 500 c.c. of a 10 per cent glucose-saline.

A few notes of warning should be sounded. Do not use these solutions in larger amounts than that given above. One may perhaps go to 700 c.c. in large women. The degree of dehydration preceding the intravenous injection will offer itself as a guide to the quantity of solution to be used. It is better in most cases to be content with 500 c.c., with the intention of repeating after a few hours. In the meantime one may note the elimination. I have seen the tissues of patient who have died after large doses of intravenous solutions and the tissues have become waterlogged.

The improvement is usually prompt, but it may only be transitory. This is an indication to repeat the treatment. Often it is only after the second, third or fourth injection that the improvement is permanent. In one classical case the injections were in the twenties, with ultimate cure.

Soda bicarbonate in small doses by mouth is indicated. If not tolerated, drachm doses dissolved in four ounces of water by rectum every four hours is often very efficacious. Bromides added to this, when there is indication, will often act beneficially.

Where glucose saline for intravenous use is not available, the Murphy drip is employed as a second means of introducing glucose into the system. I have used it and have seen it used in a large number of cases and in not one have I found any benefit. On the contrary, the patients complain bitterly of the treatment. They all state that it aggravates the symptoms and they beg to be exempted. We know that concentrated solutions of sugar (more than 5 per cent) have a stimulating effect upon the lower bowel, and I think it is the effort to expel this irritating sugar solution that causes such crampy, uncomfortable, even distressing, symptoms. Just a word of caution here. Higher percentages of glucose have been used intravenously with, I think, advantage, and to heighten the sugar retention the sugar percentage has been increased by the use of insulin simultaneously. The procedure requires a great deal of care, and fatal results are recorded owing to its indiscriminate use.

TOXÆMIAS OF THE SECOND HALF OF THE PREGNANCY

Under this heading is placed a number of allied conditions which must be intelligently grouped to be appreciated properly. Our present knowledge permits us to form three great divisions of these cases:

1. Cases of chronic nephritis complicated by a pregnancy and its added toxæmia.
2. True toxæmias of pregnancy, known as the pre-eclamptic toxæmias. These are subdivided by their symptoms into four clinical types: (a) nephritic; (b) hepatic; (c) hæmorrhagic; (d) cerebral.
3. Toxæmias of kidneys of low reserve.

NEPHRITIS COMPLICATED BY THE TOXÆMIA OF PREGNANCY

These cases comprise more than half of the so-called toxæmias of the second half of pregnancy. The symptomatology in the early stages resembles that of true toxæmia. The cases are those in which a true nephritis antedates the pregnancy. I fancy it is misleading to speak of these cases as nephritic, because the majority of them do not show signs of nephritis before the pregnancy takes place. Doubtless, a multiplicity of pathological conditions of the kidney fall under this group; I prefer the term "chronically impaired kid-

neys,'' as covering all the types of kidney disease. Many of these cases have suffered from scarlet fever or some of the acute fevers. Others are the result of early arteriosclerosis. Still others are acute nephritis induced by causes other than pregnancy. The symptoms, course of disease, and final results, are strikingly similar, no matter what the lesion of the kidney. The interesting point is that in a vast majority of these cases the kidney lesion is not diagnosable except under the stress of pregnancy. There are thousands of women going about their daily duties, in perfect health, quite unaware that they have impaired kidneys. In a small percentage of these cases you can demonstrate the impaired function of the kidney as evidenced by a trace of albumin, a few casts, and perhaps a few blood cells, but in the very vast majority of cases the minutest tests will not give the slightest inkling of disease. What we lack most is an efficient test for the kidneys whereby we could assure prospective mothers that their reserve is sufficient to warrant a pregnancy and labour without undue risk. Then we might go a step further and require the same assurance as regards the liver and the brain. I think perhaps the Mosenthal test of the urine, to determine the concentration powers of the kidneys, gives one the earliest reliable information upon such cryptic kidney impairment.

Depending upon the degree of damage sustained by the kidney, decompensation will manifest itself early or late in the pregnancy. Needless to state, the greater the previous damage to the kidney the earlier in the pregnancy will symptoms appear. If symptoms appear only in the last month of pregnancy, in the first pregnancy, they will appear earlier in each subsequent labour, owing to the infliction of a quota of damage by each pregnancy together with the added effect of the wear and tear of the intervening years. Doubtless, it will appear to most of us that the added load of an average six pound child should not be a very great burden. But this is not the proper viewpoint. Physiologists state that cell differentiation and division (metabolism) is twenty-five times more rapid in the embryo than in the adult. If this is the case then a woman is doing the elimination work of 5, 6 or 7 lbs. multiplied by twenty-five. Add to this the ordinary toxæmia of pregnancy (for every pregnant woman is toxic), and we have a clearer appreciation of the load of the maternal organism.

Let me describe a typical case of chronic impairment of kidney function without complicating the picture unnecessarily by superadding a toxæmic state arising out of the pregnancy.

Usually the first sign is a slowly and steadily rising blood pressure. There is, to a sensitive physician, something characteristic and formidable in this type of blood pressure. It is so insidious; it is so persistent; when the patient is put under treatment it usually falls for a few days and then comes back again in full strength. There are no marked remissions. High pressures of 150, diastolic, and 250, systolic, are frequently maintained for weeks. Hæmolysis follows quickly and the patients soon show signs of grave anæmia. This is, I think, the second and most constant sign. Later, headaches develop, followed occasionally by gastro-intestinal disturbances. Œdema is rare and usually slight, if at all present. Puffy eyelids are seldom seen. The urinary findings are extremely variable. In the interstitial types of kidney disease there will frequently be a total absence, or but the merest trace, of albumin, an occasional granular cast, but a constant low specific gravity urine, with a low concentration index, as indicated by the Mosenthal test. In the parenchymatous type albumin may be abundant; casts in large number, blood cells and high concentration. So the urinary picture varies according to the kidney lesion. Chemical examination of the blood usually shows retention products, due to faulty renal elimination. Impaired vision frequently develops, due to albuminuric retinitis, as in ordinary nephritis. Normal vision is seldom completely restored.

As the impaired kidney function declares itself more and more, interesting changes take place in the placenta. As the pregnancy progresses the substance of the placenta becomes progressively more invaded by white infarcts, and as the functioning part of the placenta becomes more and more encroached upon by the spreading of the infarcts, the child suffers as to its nutrition, its aeration, and elimination. The fetus grows weaker and eventually succumbs, and becomes macerated. The mother often states that as the weakness of the child progressed its movements grow more infrequent and weaker and eventually stop. This is one of the most common causes of death of the fetus *in utero*, and has always to be taken into account when summing up a case of this character. Should the child be born before death overtakes it, it is emaciated, weak and senile-looking. Such generally improve if they survive the ordeal of birth, showing that their organs are not so severely damaged as the general condition might lead one to believe.

Of course it is easy to understand that cases of nephritis complicated by pregnancy suffer not only from the physical effects of the increased work of metabolism of the mother and child, but there is superadded in every case the toxæmia incident to every pregnancy. This last factor may be so masked by the nephritis as to be inappreciable. In others it is more pronounced, and in others the toxæmic state may be so dominant as to mask the nephritis. This last possibility is, I think, a rare event. One would imagine, *cæteris paribus,* that women affected by an antecedent nephritis would be more prone to manifest the grave symptoms of true toxæmia of pregnancy. But it is one of the peculiarities that this is not borne out by experience, at least not by my experience. The improvement which these cases show in the first few days of treatment, then the relapse to the *status quo ante,* and the slow insidious progress of the disease, are characteristic of this condition.

Prognosis.—The nephritis, which is the primary underlying lesion, is usually chronic. It may date back many years. The renal function

may have been impaired but slightly, or the kidneys may have been seriously involved at the outset of the nephritis. In the graver forms the symptoms of renal incompetency declare themselves early in the pregnancy. If there is but slight impairment the renal decompensation will manifest itself in the later months only. In the former cases long months of relative renal insufficiency will damage the kidneys still further and very severely and the state of that woman is much worse at the end of, than before, the pregnancy. In our pride of accomplishment, I have seen many such cases kept in bed for months on a milk, or very restricted diet, in the hope of carrying to full term or to viability. You can see these patients becoming emaciated day by day, the blood pressure rising higher daily, reaching frequently between 200 and 300 systolic, and in the end a dead baby is born, and the mother's life is shortened by many years. In some cases of course the patient takes matters into her own hands and decides the matter for herself, in spite of counsel. This happened in two of mine. In the first instance I lost both mother and child, and in the second case the mother escaped when the situation seemed hopeless, and the child was born so weak and emaciated that I had absolutely no hope of its ever being able to dilate its air cavities. But it survived, and is now a vigorous infant. I have since sterilized the mother.

It is difficult to prognosticate the length of life that may fall to the lot of any given case. I have many of these chronic nephritics who are still alive and well, with only a slight elevation of blood pressure, and generally good health, for many years after several attempts, some successful, some unsuccessful, to have children, followed by sterilization. I saw one recently. She comes regularly for examination. She enjoys good health, still has signs of nephritis, and yet she was sterilized in 1912 after three unsuccessful attempts to carry to full term. Most of them succumb in much shorter periods, owing to accidents arising out of cardiorenal changes.

We owe it to such patients to lay all the cards on the table, stating the amount of damage already suffered by the kidneys, the approximate damage to be expected by continuing this pregnancy to viability or full term, the chances of the baby succumbing at any stage, and the ultimate impairment to be expected by this and each subsequent pregnancy. The follow-up system has nearly always demonstrated that, though these cases were free from signs of nephritis before the pregnancy, one year after the pregnancy the majority show elevation of blood pressure and more or less definite signs of vasculo-renal disease.

Treatment.—These cases come under the accepted treatment for cases of nephritis. A protein-free, salt-free diet, of milk at first, with carbohydrate and fat additions later is strongly recommended. Mild catharsis and general hygiene, with maintenance of body heat, are essential. There is added, of course, the question of the pregnancy. In the later months of pregnancy, notably after viability, the question will arise at once whether it is in the interests of both mother and child to allow the pregnancy to go to full term, or to recommend artificial induction both for the mother's improvement and in the hope of getting a living child. In respect of these two questions each case must be judged upon its own merits. If the kidney insufficiency has declared itself already for a considerable period, if the anæmia is pronounced, the blood pressure high and sustained, there ought to be no question about bringing on artificial labour to save the child and prevent irreparable damage to the mother. If the case is seen before viability, and the decompensation of the kidney is not very pronounced, and especially if the mother is a primipara (she is not likely to have any other children), the case may be carried to and slightly beyond viability for the purpose of artificial induction. On the other hand cases of severe decompensation, manifested by anæmia and high systolic and diastolic blood pressure, demand surgical intervention. A not infallible, yet very good, clinical guide is found in the earliness or lateness at which the symptoms of decompensation declare themselves. Evidence of decompensation early in the pregnancy means gravely affected kidneys and vice versa.

What method is to be recommended for surgical intervention? If, owing to kidney insufficiency, a woman cannot carry her pregnancy to a term, the chances of her ever doing so in a later pregnancy are hardly worth considering. The damage of the present pregnancy added to the effect of wear and tear of the interval, make a possible future pregnancy a great menace. We should weigh these cases very carefully, taking into consideration every possible factor, and if it is desirable that future pregnancies should be prevented, and if the patient's present condition does not contraindicate it, Cæsarean section, with sterilization by sectioning of the tubes, should be the operation of choice, especially in the baby's interests. On the other hand, should the patient's condition warrant only the smallest intervention at the time, premature induction followed by sterilization several months later, will appeal to the conservative as rational. Naturally, the facilities at the surgeon's disposal must ever be a great determining factor.

PRE-ECLAMPTIC TOXÆMIA

Cases of true toxæmia of pregnancy have undergone a great change in recent years. We see an equally large number of toxæmias of the milder types, but on the other hand eclampsia, which is the climax of a true toxæmia, has become relatively rare. The toxæmia of pregnancy which leads, if neglected, to eclamptic seizures is spoken of as pre-eclamptic toxæmia, to distinguish it from the other types, namely, the nephritic and the toxæmia of low kidney reserve.

The incidence of eclampsia, as a sequel to pre-eclamptic toxæmia, has fallen very markedly, owing to the diffusion of knowledge among the laity, and owing to the careful observation of expectant mothers in the maternity clinics which are easy of access. There is probably no type of case that responds so readily to treatment as the pre-eclamptic, and the reward, namely, the prevention of such a cataclysm as convulsions, more than justifies and repays every effort.

The early recognition of the pre-eclamptic states is the determining factor in avoiding eclampsia, and the response is so uniformly gratifying, especially when properly grouped, that the incidence of eclampsia nowadays is limited to cases which are inaccessibly far from medical advice, or to cases who have not learned the danger signals of toxæmic states. The development of eclampsia, except in a few cases as will be described later, usually means culpable negligence on the part of physician or patient. In nine such cases out of every ten the neglect is due to the patient's own gross indifference or ignorance.

So far as we know the toxæmia of pregnancy is a general toxæmia, poisoning the blood and lymph and bathing all the tissues equally. But the susceptibility of the different tissues to take harm from this varies very considerably, and is one of the great factors in determining clinical types. Another determining factor is found in the irritation produced upon certain organs of elimination in their efforts to excrete a toxic product in concentration. To these may be added a third factor. I am of the opinion that the composition of the toxic substance of pregnancy is a very complex one.

We may recognize four clinical types of pre-eclamptic toxæmia. These are all manifestations of the one toxic state, but, owing to the factors mentioned above, one system may be affected more than another, and the breaking down of the function represented by that system determines the clinical type.

(*a*) *The renal type.*—In this type we meet all the signs of a more or less acute nephritis. In the early cases the blood pressure begins to rise and with it there are signs of renal decompensation in the nature of a reduced concentrated urine, dark in colour, of high specific gravity, a goodly amount of albumin, numerous casts, occasionally blood cells, slight œdema, headaches, frequent nausea and vomiting. With present day hospital efficiency most of the cases come in from the maternity clinic with only slightly elevated blood pressure and slight signs of renal inefficiency. In the severer cases the albumin may read 10 or 12 grams to the litre and boil solid; œdema may be very pronounced and general; and the urine may be partially or completely suppressed, or may be almost pure blood. The cardinal symptoms of eclamptism — the warning signs of an impending convulsion—may appear in the form of severe epigastric pain, intractable supraorbital neuralgia, psychosis, muscular twitchings, or blindness.

The blindness of this and the hepatic types of toxæmia differs very markedly from that of the previously described type — the nephritic type. In the true toxæmic type the eye grounds do not present any pathological lesion except œdema of the optic nerve. We may look upon the eye in such cases as a mere projection of the brain and it is involved in the same congested œdematous states. This type of blindness passes off as soon as the toxæmia is over, frequently disappears completely in twenty-four hours and leaves the vision quite unimpaired. The renal disease in this type of case is merely an accident of the toxic state. It is an expression of the irritation caused the kidney in its endeavour to eliminate concentrated poisons. The blood pressure is salutary up to a certain point. It is an expression of the endeavour to force the circulation in the kidney and promote elimination. Lowering the blood pressure is dangerous, except as a temporary expedient to prevent damage to gain time. The whole of our effort must be spent in diluting the toxins so that a weaker concentrate will be presented to the kidney. A kidney will eliminate a given quantity of poison in a given time if presented in diluted form, but will baulk at the same amount of poison in greater concentration.

The renal type of pre-eclamptic toxæmia, before the onset of eclampsia, is very amenable to treatment and the prognosis is good. If neglected, these cases grow progressively worse until eclampsia supervenes.

(*b*) *The hepatic type.*—This is the second most common type of pre-eclamptic toxæmia. It is a more dangerous form of manifestation than the renal. It is an expression of irritation amounting to necrosis of the liver cells, due to the direct effect of the poisons upon the parenchymatous cells. Whether the focal necrosis of the lobules is due to the direct chemical action of the poison alone, or whether it is a condition arising out of chemical action,

and excretory irritation and starvation, it is quite impossible to state.

The type manifests symptoms arising out of defective liver function. The resistance of the body is equal to that of its weakest system and the weakest system in these cases is the hepatic, or, better still, the gastrointestinal, system. Naturally, the liver is not singled out to sustain the whole attack. Other organs will show more or less the effects of the systemic toxæmia, but the liver bears the frontal attack, and the other structures are overlooked in the overwhelming effect of the attack at the pivotal spot.

The hepatic differs from the renal type in that there is jaundice, and usually more antecedent gastrointestinal disturbance, and, negatively, in the absence of œdema and marked renal deficiency. The icterus is often somewhat late in appearing. A word of warning will not be out of place. The jaundice in such cases may not be due to the characteristic necrosis of the liver due to toxæmia. In some cases the icterus is out of all proportion to the severity of the toxic symptoms and may be a catarrhal jaundice secondary to gastrointestinal disturbance. I have seen two such cases in the past year where I was tolerably certain that the vomiting of toxæmia had produced catarrhal cholangitis. These were treated accordingly and recovered, whereas had the jaundice been of true hepatic toxic character the condition would have gone on ultimately to acute yellow atrophy.

The onset of pre-eclamptic jaundice betokens a serious condition and demands energetic treatment. It doesn't do to procrastinate unduly in such cases, because the liver necrosis and shrinking may be much more advanced than clinical findings would indicate, and when the liver has suffered beyond a certain degree, recovery becomes impossible, even though the primary cause of the toxæmia be removed. Furthermore the effect of an anæsthetic, when surgical intervention is necessary, is a serious problem, and it becomes a point of fine discrimination to choose the anæsthetic that will inflict the least amount of injury upon an already badly damaged liver.

When eclampsia develops in the hepatic type the recoveries are fewer than in the renal types. That this is so is not surprising when one sees at autopsy the tremendous amount of damage that the liver has suffered in such cases.

(*c*) *The hæmorrhagic type.*—This type is characterized by its strong tendency to develop hæmorrhagic states. It matters not an iota whether the hæmorrhage is a retroplacental one, or whether it is a general purpuric state; the underlying cause is the same in both cases, and the difference is purely relative, or a matter of degree.

There are certain peculiarities about this hæmorrhagic type that bring it into close analogy with similar toxic states in infections. Septic hæmorrhage may be uterine, but it may also be general and purpuric. The underlying cause is the toxic state and the difference is also only relative. This close resemblance between microbic toxæmia and the toxæmia of pregnancy makes the comprehension of the latter much easier. Just as in microbic hæmorrhagic states the hæmorrhages are much more likely to come in low grade, long continued infections which, in a previous paper on purpuric infections, I have described as cumulative toxic states, so in the pre-eclamptic toxæmias the symptoms of toxæmia, such as slight blood pressure and general malaise, may be almost negligible, but suddenly, after this toxic state has continued over a period of weeks, without any symptoms to warn one, the patient develops a retro-placental hæmorrhage or a general purpuric state. In many of these cases the toxic condition is diagnosable only in retrospect, so few are the symptoms of toxæmia. It is not always so. Purpuric states sometimes develop as a superadded grave condition in other pre-eclamptic types and in true eclampsia.

It is well to remember that increased blood pressure is the most constant sign of pre-eclamptic toxæmia, and also, to bear in mind that the average normal pregnant woman's blood pressure is about 65 or 70 over 90 to 100. So that a blood pressure of 90 over 120 means usually twenty degrees of toxicity. If we assumed that the normal blood pressure were 90 over 120 and the pressure registered 100 over 140 we would not hesitate to pronounce the case as toxic in character, and yet a blood pressure of 120, in the vast majority indicates that the case is definitely one of toxicity.

What happens in these cases to cause hæmorrhages is quite unknown. It would seem as if of a sudden the normal relation between contained and container were lost. Osler has pointed out that the toxins exercise an influence upon the blood vessels, causing them to lose the power to retain the plasma and blood. Behind the development of toxic extravasations there is often a vascular dyscrasia as evidenced by allied conditions, such as urticaria, angioneurotic œdema, hayfever, and asthma. We know that the great majority of retro-placental hæmorrhages are toxic in origin and I saw one notable case in which the hæmorrhagic state was general and purpuric, and at autopsy every mucous and serous membrane was either bleeding or ecchymotic, studded with petechiæ. The treatment will not be as effective as might be until we learn to recognize the mild toxic symptoms and institute proper treatment before the hæmorrhagic state sets in.

(*d*) *The cerebral type.*—This is by far the

most insidious and most fatal type of eclamptic toxæmia. In the majority of cases the prodromal symptoms are quite absent. The prodromal signs of toxæmia are either absent or negligibly slight, and the eclamptic seizure comes on with a rapidity and a severity that baffles every known means of meeting the crisis. I have known quite a few patients who had been under careful examination and pronounced normal just a couple of hours before the onset of convulsions. Such convulsions! They are of the severest type followed by the profoundest coma, and the seizures in some cases never cease. In one of my cases there were constant twitchings of all the muscles of the body after the first severe seizure, and the patient gradually grew weaker from exhaustion without ever showing the slightest sign of rallying. This is the rule. How are we to meet such a condition? If we cannot diagnose by close observation the prodromal signs (if there are any), then the situation seems hopeless. In reviewing some of these cases we can find symptoms that perhaps should have been given more consideration, but such is always the case when we analyze our results by careful retrospection. The weak system would seem to be the nervous tissues, and the toxic state must be mild and cumulative or we certainly would have more to warn us. These cases are almost hopeless from the moment of the onset of convulsions, and constitute a fairly large percentage of the deaths from eclamptic toxæmia.

TREATMENT OF THE PRE-ECLAMPTIC TOXÆMIAS

Upon this there is unanimity of opinion. There are three duties that devolve upon the physician.

Firstly. He should reduce the daily work that has to be done by the lowering to a minimum mental and physical effort, and by reducing the diet to an easily assimilable quality and to a quantity just equal to, or even below (for a short period only) corporeal needs.

Secondly. Lessen the amount of work that will fall upon the kidneys by the dietary methods and the rest enjoined above, and promote the elimination by the kidneys by diluting the concentrated toxin. This is best accomplished by the ingestion of quarts of water daily.

Thirdly. Assist elimination by activating the bowels by saline purgatives, and activate the skin by keeping the patient warm and promoting unconscious perspiration.

Cases of pre-eclamptic toxæmia are a pleasure to treat (in contrast to those of the nephritic type) as they usually respond so readily to treatment. The success depends largely on recognizing the symptoms early before great damage is done, and when the organs are in such a state of freedom from disease that they respond to careful treatment.

The disappearance of symptoms and signs and the slow falling of the blood pressure are the best prognostic signs. We frequently find marked, unaccountable remissions in the blood pressure in pre-eclamptic toxæmia, a condition almost unknown in nephritic toxic states. The pre-eclamptic is generally plethoric, full-blooded, and the facies frequently presents a generally swollen state, but not an œdema. This again is in marked contrast with the pallor of the nephritic type.

In the pre-eclamptic toxæmias the risk to the fetus is almost negligible. Death of the fetus occurs usually only after repeated convulsions, but practically never occurs in the pre-eclamptic state except in the retroplacental hæmorrhage in the hæmorrhagic type. In marked contrast to the nephritic toxæmia the placenta is quite unaffected in pre-eclamptic toxæmia. And the incidence of pre-eclamptic and eclamptic toxæmia is no impediment to other normal pregnancies, nor does it predispose to a repetition of this condition.

The treatment of eclampsia, on the other hand, is one of contrasts. There are those who advocate the conservative treatment of Strogonoff, or Stander's modification, and there are those who maintain that the uterus must be emptied at once by the easiest and at the same time, if possible, by the safest methods for any given case. Be it stated here that not any one method will save all cases. There are cases, such as the cerebral types, which will die in spite of any form of treatment, and there are others which will get well owing to or in spite of any treatment. The Strogonoff method gives excellent results in a large percentage of cases, and offers to the man who has not hospital facilities and surgical skill an easy method of treatment that is beyond higher criticism. Stander's modification requires a great deal of sangfroid to carry it through to its ultimate success. I think it is safe to state that in large institutions where surgical facilities are at hand, the obstetrician having tried out the Strogonoff method loses faith in himself or in the the Stander's method and resorts to surgical intervention.

There is one point of treatment upon which there is unanimity of opinion as to its value, that is bleeding. I have never seen any but beneficial results follow the withdrawal of three or four hundred cubic centimetres of blood. Frequently, the convulsions cease immediately after this simple procedure. It relieves pressure and œdema of the brain and is always to be advocated as a temporary measure, at least, until other forms of treatment can be brought into effect. If this is followed by intravenous injections of normal

or glucose saline, these have the effect of diluting the poisons and promoting diuresis. If the patient is conscious in the intervals magnesium sulphate should be given slowly, followed by water *ad lib*. If the patient is comatose, the use of the stomach tube to wash out the stomach with soda bicarbonate solution, followed by the instillation of two ounces of a 50 per cent magnesium sulphate, is often recommended. You will readily see that the jump is a broad one from the Strogonoff method to such an active therapeusis.

The surgical methods are varied. First of all let me state that accouchement forcé has none but antagonists at present. The condition of the cervix and primiparity are factors which weigh heavily in the scale in favour of Cæsarean section. On the other hand a non-resisting or cervix of multiparity favours the bag or bougie induction.

Vaginal hysterotomy has its advocates. A man usually advocates what he does best, so that experience and skill are necessary in undertaking evacuation by this route.

Treatment such as outlined above is quite as necessary after operation to relieve the toxæmia.

TOXÆMIA OF KIDNEY OF LOW RESERVE

This subdivision is one of doubtful boundaries and leads to much confusion. It includes cases which have congenitally small or congenitally defective kidneys, which have to work to almost full capacity to discharge the duties of the daily round and toil. There is very little reserve force left for emergencies, and when pregnancy occurs a major emergency is set in motion. The kidney strives to rise to the demand, but it is only a time before the reserve is used up and metabolic products are retained. This may be complicated by a toxæmia of greater or lesser degree, just to make matters a little more complex. Upon first thought, one is apt to conclude that such congenitally defective kidneys are uncommon. But, when one realizes that few men and fewer women are absolutely physically balanced and that underdevelopment is so frequently found in other organs such as heart, physiognomy, eyes and sex organs, it would not be surprising that those cases are probably much more numerous than any of us surmise. The term "kidney of low reserve" is in truth, a very confusing one. Every kidney that is damaged is a kidney of low reserve, and the reserve diminishes in inverse ratio to the damage. That is self evident. It would perhaps make the grouping more in accordance with clinical and pathological findings to leave the above cases under a heading of their own and term them "congenital renal deficiencies." All others including the group described below would fall under the nephritic toxæmias.

The difficulty is in diagnosing the congenital renal deficiencies. A diagnosis by direct methods is impossible, but is arrived at only by a process of exclusion. They do not present the characteristics of nephritic toxæmias because their urinary findings are not the same; their concentration index in the urine is not lost, as in nephritis; and visual and other defects are lacking. On careful examination other stigmata of under-development frequently become obvious and offer a clue to the diagnosis.

The treatment consists in lightening the load upon the kidneys by rest, physical and mental, and by a lessened protein diet and a quantity of food just sufficient to supply the body demands, and a careful maintenance of normal bowel function. The endeavour will be to carry the child to viability at least, and under close observation to carry the pregnancy as far as possible beyond the period of viability without subjecting the mother to too much renal damage.

The second group, which is frequently but wrongly, placed in this category comprises those cases whose reserve has been used up by frequently repeated pregnancies. They are cases of damaged kidneys and therefore nephritics. The history usually runs as follows: Numerous rapidly succeeding pregnancies. During the seventh pregnancy, (let us suppose) the patient develops retention symptoms and blood pressure during the last month. In the eighth pregnancy the retention symptoms come on a month earlier and so on.

THE BARBITURATES IN LABOUR CASES.—Amytal (iso-amylethyl barbiturate) and sodium amytal have, so far as we know, not yet been used as analgesics in confinements in Great Britain. A preliminary report from the Mayo Clinic, therefore, although based on under 50 cases, is valuable. For the results seem to justify further trial and the hope that here is a drug which can be given orally and which, while it affords analgesia, not only does not delay but tends to facilitate the progress of labour. The drug is given in divided doses, grs. 9 being regarded as the maximum dose. Labour is shortened because of the relaxation produced in the soft parts. The drug is to be taken late in the first stage of labour, grs. 3 being given as the first dose. If, in the course of the next four hours, the tone of the muscles is found to be returning and the patient is worried by the uterine contractions, the dose is repeated. The baby appears to be always unaffected by amytal. J. S. Lundy states that after grs. 13 had been given for a Cæsarean section the infant cried on delivery from the uterus.

Men and Books

ON APOTHECARIES, INCLUDING LOUIS HEBERT

BY W. H. HATTIE, M.D.

Halifax

On the second of August last, at Annapolis Royal, a tablet in memory of Canada's first apothecary—Louis Hebert—was unveiled in the presence of a large representation of the Canadian Pharmaceutical Association. The tablet was erected by the Nova Scotia Pharmaceutical Society, while the ceremony was preliminary to the annual meeting of the national association which was later held at Halifax. This is not the first Canadian memorial to Hebert in Canada, but it is the first to be erected at the scene of his earliest activities, on what is now Canadian soil. Inasmuch as Hebert, in common with other apothecaries of his time, engaged in the practice of medicine, the ceremony of August the second has interested many physicians and has suggested a short article on apothecaries in general with some particular reference to the first of the craft to be identified with Canada.

While some writers attribute the development of the art of pharmacy to the Arabians, it cannot be doubted that the preparation and compounding of drugs may be traced back to a very remote period. Certainly the Egyptians possessed at least a crude skill in this respect. It is not known when the earliest attempts were made to relieve the physicians of the duty of gathering and preparing such things as were believed to have medicinal value. About the time of Hippocrates there were merchants who kept drugs for sale, while persons of lower social rank gathered roots and herbs. Some physicians, Galen included, were so doubtful of the genuineness of the wares of these gentry that they depended only on what they collected themselves. Many of those who were engaged in the drug business were of ill-repute, and were suspected of being ready to indulge in any doubtful enterprise for which they might be retained. Such distrust of drug vendors persisted for long, although in the days of the Byzantine Empire a class of men arose who had the confidence of the physicians, and who devoted themselves to preparing their prescriptions.

Seemingly the introduction of what might really be called pharmacies is to be credited to the Arabians, and it is said that the first public pharmacy was erected at Bagdad in the eighth century. Some state control was now instituted, and definite advance was made in pharmaceutical science.

The ordinance of Frederick II, promulgated in 1224, which set down the conditions under which medicine might be practised in the Sicilies, contained a section dealing with apothecaries and prescribed conditions under which they must carry on their work. In France, at least as early as the thirteenth century, there was seemingly some provision relative to the education of apothecaries, and they subscribed, on oath, "to honour, esteem, and serve, not only the doctors of medicine who instructed them in the knowledge of the prescriptions of pharmacy, but also the teachers and master-apothecaries." At that time, the French apothecaries were under the oversight of the physicians, but were allowed to treat illnesses, and in the same century they were formed into a guild, the masters of which later became entitled to wear long black gowns with wide sleeves and velvet facings. About the middle of the fourteenth century the Paris faculty made representation that the apothecaries were going too far—*inter alia*, "that these people alter remedies against all reason and all the rules of art, and supply and administer very strong purgatives, and badly acting clysters, concerning the use of which they are not sufficiently informed." Similar complaints in other countries indicate that friction was already developing, and that the apothecaries were looking forward to emancipation not only from the grocers, with whom they were originally associated, but also from the physicians. Ordinances were promulgated in various countries which aimed at their control, but these had effect only upon the better type of apothecaries, who were seemingly in the minority. By the time that Hebert appears on the scene there was much bitterness, and the apothecaries generally were regarded with disfavour by physicians and laymen alike, although there were doubtless among them many men of fine character who would naturally wish for a better understanding with the physicians and a more desirable relationship to them.

Perhaps the wish of the apothecaries to better their position was justified on grounds other than natural and reasonable ambition. It would appear that the physicians did not always treat them considerately and really forced the more spirited of them into rebellion. We can follow the situation in England more readily than in other countries, and it may be worth while to devote some attention to what is recorded of it in the Mother Country.

William Bulleyn, a relative of Anne Boleyn (made famous by Henry VIII), was a physician of note—one of the most sagacious and interesting of his time. He died in 1576, so we can attribute to an earlier date his famous rules, twenty-one in number, of which we quote only:—

"The Apoticarye

1. Must fyrst serve God, forsee the end, be clenly, pity the poor.
2. Must not be suborned for money to hurt mankynde.
13. That he neither buy nor sel rotten drugges.
15. That he put not in quid pro quo without advysement.
17. That he meddle only in his own vocation.
19. That he do remember his office is only to be ye physician's cooke.
20. That he use true measure and waight."

Whatever his intent may have been, it is not likely that the apothecaries would take kindly to all that Bulleyn stipulated. Nor can we suppose that they were greatly mollified by such usage as was accorded them by Winston (1575-1655), lecturer in anatomy at Gresham College, who was applauded by Hamey for treating his apothecary as a master might a slave. Winston knew apothecaries, Jeaffreson tells us, "in the day of their humility—before prosperity had encouraged them to compete with their professional superiors." Now, however, the day of their humility was about to pass, and it was not to be for long that men could write as Chaucer had done of his "Doctour":

"Ful redy hadde he hise apothecaries
To sende him drogges and his letuaries,
For ech of hem made oother for to wynne."

Step by step the apothecaries made progress towards a better status, and every step was contested by the physicians. Many in their ranks were of lowly birth, many were poorly educated, not a few were grossly dishonest, some were immoral—all of which could, perhaps, also be said of some of their medical contemporaries. They were further handicapped by unpopularity with the laity, for all apothecaries were suspected of making inordinate charges for their wares, and drug-lovers are at one with their fellows generally in their objection to high prices. Colour was given to the suspicion by abounding evidences of apothecarial prosperity, which contrasted with the relative impecuniosity of the greater number of physicians. So for a time the doctors had at least the satisfaction of being in the greater popular favour, and, while they envied the apothecaries their riches, they endeavoured to be philosophical. Presently, however, they were forced to realize that those who had been their adjutants were becoming their competitors. The apothecaries were prescribing, and later they were diagnosing, and later making other inroads upon the physicians' domain. This, as we have seen, was not in England alone, but was rather general in European countries. In Germany, insult was added to injury when the elaborate shop fronts of apothecaries came to be adorned with stone figures of the great physicians of the past. Naturally there was resentment, and doubtless this was whetted by jealousy, and the behaviour of the physicians was not that which might be expected to prevent a breach from forming and widening.

In spite of opposition the apothecaries continued to gain ground. Presently they had the satisfaction of securing legal recognition. In 1606 James I "willed, ordained, and granted that all and singular the Freemen of the Mystery of Grocers and Apothecaries of the City of London . . . should and might be . . . one body corporate politique, in deed, fact, and name, by the name of Warden and Commonalty of the Mystery of Grocers of the City of London." Eleven years afterwards, on the recommendation of Mayerne and Henry Atkins, physicians to King James, the apothecaries were dissociated from the grocers, and were separately founded as the Company of Apothecaries, but under certain control by the College of Physicians. It was not long before the apothecaries became restive under this control, and, as they prospered, they became resistent. The more daring ventured to prescribe without previous consultation with a physician, and to otherwise encroach upon the physician's preserve. Such independence could not be brooked by the "senior arm", and bickering quickly developed into open quarrel. The physicians were not united; the more affluent, as a rule, stood firm against such an invasion of professional rights, while those who needed fees courted the apothecaries who would consult with them. The quarrel became more and more bitter, and in time both sides issued circulars and pamphlets, some of which were highly discreditable.

The "Dispensarian Campaign" was not, as might be suspected from the name, a religious movement; it was a part of an unseemly squabble between the physicians and the apothecaries which brought no honour to either party. The laity took sides, and, in the hope of gaining favour with the public, it was decided at a meeting of the College of Physicians (1687) that "all members of the College, whether Fellows, Candidates, or Licentiates, should give their advice gratis to all their sick neighbouring poor, when desired, within the City of London, or seven miles round." But the sick neighbouring poor could not afford to have their prescriptions filled by the apothecaries. The physicians declared that the prices demanded were extortionate. The apothecaries countered with a proposal to supply medicines at rates pronounced reasonable by a committee of the physicians. The physicians seemingly did not consider such an arrangement satisfactory, and a committee of the College suggested that "the College should furnish the medicine of the poor, and perfect alone that charity which the apothecaries refused to concur in." It is not clear that the apothecaries were really in the wrong, but the version of the College is that "after divers methods ineffectually tried, and much time wasted in endeavouring to bring the apothecaries to terms of reason in relation to the poor, an instrument was subscribed by divers charitably disposed members of the College, now in number about fifty, wherein they obliged themselves to pay ten pounds apiece

towards the preparing and delivering medicines at their intrinsic value." Thus there came to be established (1696) the first dispensary, in the College of Physicians, Warwick Lane, where the poor were supplied with medicines at the actual cost price. And thus originated a system which has ever since caused anxiety to many members of the profession.

Of course, the apothecaries were furious, and did all that was possible to cast doubt upon the altruism that had been assumed by the College. Moreover, many members of the College were unfavourable to the plan, and the profession was divided into two camps, the dispensarians and the anti-dispensarians. The apothecaries held together and agreed to recommend no patients to dispensarians for consultation, and the anti-dispensarians refused to consult with the dispensarians. There was a vast amount of recrimination. Scribblers on either side poured out innuendo, abuse and even scurrility. Those who were gifted at rhyme made full use of that gift. Conspicuous for decency in this avalanche of writing, although it heaps ridicule on the apothecaries and anti-dispensarians, is Garth's poem, "The Dispensary". Garth may almost be considered one of the remarkable group of literary physicians of the seventeenth and eighteenth centuries, a group which included Akenside, Goldsmith, Crabbe, Walcot and Blackmore, and he was consistently a dispensarian. His poem was the most meritorious of the many writings—books, pamphlets, broad-sheets—that were circulated in this undignified campaign. Such titles as "Physick lies a-bleeding: The Apothecary turned Doctor" and "The Dispensarians are the Patriots of Britain" give an idea of the bitterness that existed. Arbuthnot, in his "Essay on an Apothecary," thought it a pity that, in order to prevent the country from being overrun with apothecaries, it was not permissible to anatomize them for the improvement of natural knowledge. The apothecaries returned Rolands for Olivers, and were equally as vigorous in their satire and abuse as were the physicians. In the end the advantage was with the apothecaries. Their right to prescribe was contested by the College, taken to the courts, and finally (1703) to the House of Lords, where the decision was in their favour. The College still claimed the right to inspect the wares of the apothecaries and to seize such as were adjudged unfit to be dispensed. Arbuthnot, with two associates, seized some wares of a Mr. Goodwin, in 1727, whereupon Goodwin brought legal action and recovered substantial damages. This, seemingly, decided the physicians against further interference. The tumult and the shouting died, and within a comparatively few years there were apothecaries who did no dispensing but carried on a general medical practice, free from either fear or favour.

It was, then, to such a body that Louis Hebert belonged, and at a time when apothecaries generally were regarded with little favour. Hebert's father had carried on the business of an apothecary in Paris, and the business had passed on from father to son. From what we can learn of the character of Louis Hebert we may surmise that the conditions under which this business had to be conducted were not to his liking, and may have been a factor in determining his migration to Canada. Port Royal had been settled in 1605, and in the following year he accompanied Poutrincourt on his return to the little colony after a short visit to France. With him came the surgeon-apothecary, Daniel Hay, commonly regarded as the first to engage in medical practice in Canada, although the writer has contended that a medical man of some sort was attached to De Monts' party which spent the winter of 1604-5 at St. Croix. In so small a colony of hardy adventurers Hebert could not have expected to make a fortune out of his profession even if he had had no competition. If our record of his medical work at Port Royal is complete, it would not appear that it kept him excessively busy. When Pontgrave's son shot his own hand in the excitement of a surprise attack by Indians, Hebert dressed the wound. Five years later he attended the Sagamo Membertou in his last illness. No other cases are reported. Between times he had spent about three years in France—quite long enough to permit careful deliberation over professional prospects at Port Royal before he decided to return there. From this we may assume that he had other enthusiasms than for the business of apothecary. Lescarbot says of him: "Our apothecary, Master Louis Hebert, a man who, besides his experience in his art, taketh great delight in the tilling of the ground." At Port Royal he was known as the herb gatherer, and his zeal for gardening so infected others that he is known as Canada's first agriculturist. That he was a man of parts and refinement is indicated by his admission to the famous Ordre de Bon Temps and his intimacy with Poutrincourt, Champlain, Lescarbot, and the other choice spirits of the colony, by the influence he wielded, and by the confidence shown in him; he was once entrusted with the responsibility of administering the affairs of the colony. All of this justifies the belief that he belonged to the better class of the apothecaries, but that he was more concerned with other interests.

In 1613 Port Royal was taken by the English, and Hebert went back to France and resumed business as an apothecary. Four years later Champlain persuaded him, with his family, to accompany him to Quebec, where he spent the remainder of his life. There he devoted himself to agriculture and other community interests, in recognition of which he was styled the Patriarch of New France. Dionne states that he was "granted the fief of the Sault au Matelot and the fief L'épinay." After nearly ten years of service to the community he sustained injuries in a fall which resulted fatally early in 1627.

After his death his widow and children con-

tinued to cultivate his garden, and we read that in the stressful winter preceding the capitulation to Kirke, the garden was ransacked of every root and seed that could afford nourishment. On surrendering to Kirke, Champlain asked the English commander to protect, among other things, "the houses of the widow of Louis Hebert, and of her son-in-law Guillaume Couillard." Kirke went farther and invited Madame Hebert and her family to remain at Quebec and enjoy the fruits of their industry under British allegiance. The invitation was accepted, but within a few years Quebec was restored to France and the Heberts again came under French sovereignty.

In 1710 the English took Port Royal for the sixth time and renamed it Annapolis Royal. At this historic place, the scene of twenty-six military encounters of greater or lesser moment, a tablet to Hebert's memory has now been placed by Bluenose members of the craft to which he belonged, at a ceremony attended by members of the craft from all parts of Canada. The fittingness of this arrangement compensates to some extent for the tardiness of the recognition of the merits of so worthy a pioneer[1].

1. There has been a statue of Hebert in Quebec, near the City Hall, for some years [ED.].

Association Notes

THE MEDICAL SURVEY OF CANADA

BY HARVEY AGNEW, M.D.,

Associate Secretary, Canadian Medical Association, Toronto

This survey of medical practice in Canada has been conducted by the Canadian Medical Association. So many divergent comments had been made from time to time concerning the conditions under which medical service is provided to the public, and so little accurate knowledge was available, that it seemed advisable to obtain as much information as possible from the practitioners of medicine themselves. With this object in mind a questionnaire was prepared and was accepted by the Council of the Canadian Medical Association at the annual meeting held in Montreal in 1929. This questionnaire contained not only questions concerning the radius of practice, the population served, and the facilities available, but requested information as to the application of undergraduate medical education to the practice of medicine, and requested comments and suggestions upon the present system of medical education and medical practice.

Altogether, over 1,400 completed questionnaires were returned of the 9,000 sent out. As it was, perforce, a lengthy questionnaire and as many of the 9,000 doctors on our lists are retired, engaged in full time public health, administrative or teaching work, or are otherwise not in a position to furnish the data requested, this large number of returns was exceedingly gratifying to the committee making the survey. As answers were received from every province and from every type of district, city, town or village in these provinces, we have considered ourselves justified in accepting the averaged answers as a reasonably accurate cross section of the conditions of practice and the opinions of our medical men. In but one province, Prince Edward Island, were the replies insufficient to warrant their consideration as typical of practice in that province.

The replies have been tabulated by provinces and by division into large cities (over 50,000), small cities (20,000 to 50,000), towns (2,500 to 20,000) and villages (under 2,500). These are not the legal divisions distinguishing cities, towns and villages, but it was considered that such a division would most readily enable us to separate the types of practices associated with urban and rural communities.

Signatures have not been sought, although they were volunteered in many instances. One realizes that the opinion of some astute observer, well qualified to make comment, may be overlooked thereby and averaged with others not so valuable, but the frankness that is possible with an anonymous reply has given us unvarnished statements which otherwise we might not have been able to obtain.

PART ONE

The Practice of Medicine

AVERAGE MILEAGE

A study was made of the mileage covered by doctors doing various types of practice in various parts of Canada. For this purpose doctors were requested to state the approximate radius in miles of their ordinary practice in summer and in winter, and also the extent of special trips in summer and winter. By provinces, doctors who reported doing more than exclusively office practice travel on the average for ordinary practice as follows:—

Province	*Summer radius*	*Winter radius*
British Columbia	16	19
Alberta	23	22
Saskatchewan	22	20
Manitoba	14	15
Ontario	13	10
Quebec	12.4	12
New Brunswick	11	10
Nova Scotia	11	12
Prince Edward Island	15	11

Doctors in large cities have the smallest mileage for ordinary practice, and have by far the largest mileage for special trips, owing to the calls for consultation in special cases to towns and villages at varying distances. Manitoba illustrates this point most clearly. The average mileage for Winnipeg doctors for ordinary summer practice is 9¾ miles, while for special practice in the summer it is 126 miles. The average trip in winter in special practice is 77 miles. In Quebec, the ordinary practice in Montreal is 8 miles in summer and 7 miles in winter, whereas special practice is 114 and 45 miles, respectively. On the other hand, large cities in Ontario show a comparatively short mileage for special practice (53 miles in summer and 50 miles in winter), probably due to the number of cities in Ontario.

One would anticipate that the doctors in villages would have a greater mileage than doctors in towns, but, according to our returns, in Alberta, Saskatchewan, Quebec and Prince Edward Island the reverse holds true for ordinary practice. For instance, in Saskatchewan, in the towns, the average ordinary practice is 29 miles in summer and 28 miles in winter, whereas in the villages it is 20 miles in summer and 19 miles in winter. It is interesting to note that winter weather seems to have comparatively little effect on the mileage covered by doctors. Winter decreases it a mile on the average in Saskatchewan for all groups, and, curiously enough, increases it a mile for all groups in Manitoba. The most noticeable effect of winter is in Charlottetown where the ordinary mileage is decreased from 20 to 10 and in the towns of British Columbia, Alberta and Quebec. In Ontario the mileage is decreased by one mile in large and small cities, is increased one mile in towns, and is constant in villages.

A comparison of the mileage of ordinary practice in large cities, small cities, towns and villages, considering Canada as a whole, rather than as separate provinces, is illuminating:—

	Summer radius	*Winter radius*
	miles	miles
All large cities	8.8	8.3
All small cities	10.8	9.75
All towns	14.5	13.0
All villages	16.0	16.3

Special practice is affected very little by winter except in Winnipeg, Montreal, Halifax and Charlottetown.

A comparative study of the ordinary mileage covered by doctors in towns (2,500 to 20,000) and in villages under 2,500 is quite interesting:—

	Towns		*Villages*	
	Summer	*Winter*	*Summer*	*Winter*
British Columbia	24	15½	20	24
Alberta	28	24	24	24
Saskatchewan	29	28	20½	19
Manitoba	14	15	15	16
Ontario	10	11	11	11
Quebec	18	14	13	13
New Brunswick	13	13	14	14
Nova Scotia	8	8	16	16
Prince Edward Island (Insufficient replies)	20	10	12	12

It is interesting to note the low mileage for towns and villages in Ontario, and to a lesser extent of Quebec, New Brunswick and the towns of Nova Scotia. Some of this may be due to industrial practice in mining and lumbering areas, but as these replies came from various parts of these provinces it seems to indicate as well a tendency for rural patients to seek the doctor. The small local hospital is often a determining factor in this movement.

It was noted that a large number of doctors, in considering their ordinary mileage, reported that they cover a definite radius in summer, but indicated that in winter they do not go far afield, if at all. Twenty-three per cent of the doctors reporting a summer mileage in ordinary practice report none for winter. This curtailment of winter mileage is most marked in large cities and lowest in towns as indicated below:—

PERCENTAGE REPORTING A SUMMER BUT NO WINTER MILEAGE IN ORDINARY PRACTICE

Large cities	33 per cent
Small cities	24 "
Towns	12 "
Villages	14 "
Average for Canada	18.7 per cent

AVERAGE AGE AND AGE DISTRIBUTION

The average age of *all* of the doctors making reply is 43. Apropos of the oft repeated statement that the young doctors are flocking to the cities, the following analysis of the average age in centres of various size throughout Canada is very illuminating:—

Large cities	45 years
Small cities	44 "
Towns	44 "
Villages	41 "

An endeavour was made to ascertain the distribution of the younger men in practice. A percentage study of the distribution of the doctors replying whose age was 35 years or under is as follows (internes not included):—

Large cities	24.6	per cent	of those	replying
Small cities	7.3	"	"	"
Towns	29.1	"	"	"
Villages	38.8	"	"	"

It will be noted that the villages and towns are still the favourite locations for practice for the younger men.

Analyzing the returns by provinces, the youngest doctors are located in the villages in six of the nine provinces. The group with the highest average age is located in the cities in all eight provinces, with cities as classified here and in Charlottetown in Prince Edward Island. Ontario is very even in its distribution; large cities 44, small cities 44, towns 43 and villages 42. The youngest group tabulated is in the villages of Quebec, where the average age is 38. The villages of Saskatchewan and Alberta follow next with 39.

Of all the doctors in active practice, the reports indicate that approximately one-fifth (20.4 per

cent) are over 50 years of age, and approximately one-quarter (26.3 per cent) are 35 years of age or under.

SHORTAGE OF PHYSICIANS

Judging from the replies received there does not seem to be any serious shortage of doctors *in the districts from which reports have been received.* A few replies (1.7 per cent) commenting upon a local shortage refer in the main to village areas and a few towns. There seems to be some shortage in the rural areas on the prairie and in Nova Scotia.

From other sources, however, it is known that areas in the northern and sparsely settled portions of our provinces have inadequate, if any, medical care and, therefore, are not reported in these replies. In these areas it is well known that real shortage exists and therefore the problem, in the light of statistics gathered here, seems to be one of providing medical services to the pioneer and certain rural districts and not to the more densely settled areas.

POPULATION PER DOCTOR

According to the latest available statistics there are 9,505 registered medical practitioners in Canada and the population of Canada is approximately 9,784,400. This gives an average of one doctor to 1,029 population (97 per 100,000 population). By our census, obtained by averaging all the returns received in this survey, we ascertain that in the areas reporting there is an average of one doctor to 1,221 population. The disparity in these figures may be easily explained by the fact that there are many isolated areas in Canada with a scattered population but without adequate medical care, and these areas would be included in the Government census but not in our own; moreover, many of the registered medical practitioners in Canada are not engaged in active practice. Considering Canada as a whole and analyzing the returns on the urban-rural basis, the ratio is as follows:—

Large cities—1 doctor to 1,086 population.
Small cities—1 doctor to 1,071 population.
Towns—1 doctor to 1,248 population.
Villages—1 doctor to 1,346 population.

By way of comparison, the doctors were requested to give, to the best of their ability, the population and the number of physicians in their district twenty years previously. Some of these replies could be but approximately correct, while others indicate considerable effort to obtain accurate data. Presuming that any errors of underestimation or overestimation in obtaining these data for 1909 would be more or less balanced and corrected in the total average, the ratio of doctors to population twenty years ago was approximately one doctor to 1,175 population (to-day the ratio is one to 1,221). It is difficult to compare the patient-physician ratio of the cities, towns and villages of to-day with that of cities, towns and villages of twenty years ago because of the rapid change in population and transportation. However, it is interesting to note that the large cities, as they exist to-day, report a smaller population per doctor now than formerly. This is most marked in Winnipeg where the ratio to-day is one doctor to 973 population; twenty years ago it was one doctor to 1,243 population. The average for all of the cities of Canada (large and small) at the present time is one doctor to 1,082 population; whereas twenty years ago it was one doctor to 1,138 population. In rural areas, the number of doctors per population is greatly diminished. This can be explained in the West where the smaller places have grown considerably during the past twenty years. The prairie provinces show the following village practice comparison:—

	Population per Doctor	
	1909	*1929*
Manitoba	1,050	1,504
Saskatchewan	1,058	1,735
Alberta	1,337	1,425

The change is not so marked in British Columbia, Quebec, nor in Ontario, but there is an unusual change of ratio in New Brunswick. According to these returns, in 1909 there was one doctor to 682 population; whereas in 1929 one doctor averaged 1,766 population.

Incidentally, a comparison of the doctor-patient ratio in Canada with that of other countries is of interest. Canada, as stated previously, has 97 doctors per 100,000 population. In the appendix of "Medical Education and Related Problems in Europe," the following is reported:—

United States	127	per 100,000
Switzerland	80	" "
Hungary	73	" "
Japan	73	" "
Italy	71	" "
Denmark	70	" "
England and Wales	67	" "
Argentina	64	" "
Germany	64	" "
France	59	" "
Greece	58	" "
Norway	57	" "
Netherlands	55	" "
Belgium	54	" "
Sweden	35	" "
Poland	34	" "
Mexico	24	" "

By comparison with this report, one notes that Canada ranks second in the number of doctors per 100,000 of population, being superseded by one country only, the United States of America.

"ARE YOU MAKING A FAIR LIVING?"

This question was asked because of the frequent assertion that medical men are not making a fair return for their labour. It is quite obvious that such a question is open to varied interpretation and reply, for our individual views vary on what constitutes a "fair living". The replies received may be of value, not only from the standpoint of medical economics but as a study of the psycho-

logical reaction of the average doctor to his work. It may be added that the great majority of these replies were received before the stock market slump in the autumn of 1929, and, of course, before the wheat market depression in 1930. Approximately two out of fifteen doctors (13.4 per cent) reported that, in their opinion, they were not making a fair living. A list of those area-groups wherein a considerable number of practitioners are of the opinion that their remuneration is not adequate is as follows:—

	Percentage reporting not making a fair living.
Villages, Alberta	32
Villages, Nova Scotia	19
Villages, Saskatchewan	18
Large cities, Ontario	16
Towns, Saskatchewan	16
Towns, Nova Scotia	15
Towns, Manitoba	14
Towns, Quebec	14
Villages, Ontario	14
Villages, Quebec	13
Towns, New Brunswick	13
Large cities, Manitoba (Winnipeg)	12
Villages, Manitoba	12
Large cities, British Columbia (Vancouver)	11
Towns British Columbia	11
Towns, Ontario	11
Large cities, Nova Scotia (Halifax)	11
Small cities, Ontario	10

There were three area-groups in which some unrest was found by tabulation, but from which the number of returns was not sufficiently large to warrant acceptance of the figures as definitely representing the average opinion (towns, Prince Edward Island, 25 per cent; villages, New Brunswick, 22 per cent; small cities, Quebec, 17 per cent). Other areas showed 9 per cent or less dissatisfaction, or reported 100 per cent making a fair living. By provinces:—

	Percentage not making a fair living
Alberta	18
Saskatchewan	15
Nova Scotia	14
Prince Edward Island	14
Ontario	13
Manitoba	11
Quebec	11
British Columbia	10
New Brunswick	5

A comparison of returns from a number of larger cities is interesting:—

	Percentage not making a fair living
Hamilton	19
Toronto	16
Windsor	16
Winnipeg	12
London	12
Montreal	11
Halifax	11
Vancouver	11
Ottawa	9
Calgary	5

One might summarize these results by stating that the financial remuneration seems least adequate in rural areas, especially in the west and in the Maritime provinces, and in large cities in central Canada. By provinces, Alberta seems to be the least fortunate and New Brunswick the most fortunate province, considered economically.

MEDICAL ECONOMICS

Without doubt, medical men are giving considerable thought to the general question of medical economics. Judging by the comments made, many men are of the opinion that the present system of practice is not ideal. Severe condemnation of contract practice is made by several. Health insurance and other forms of state medicine are considered by many in their replies, some expressing a doubt as to the wisdom of adopting such a system, while others feel that it would be a panacea enabling the physician to give good service and at the same time minimize the burden to him of the patient who cannot or will not pay.

SPECIALIZATION IN MEDICINE

Many and varied were the comments received upon this subject. Specialists and practitioners agree in deploring the tendency to rush into specialties. Almost invariably the advice given to young graduates is to take a rotating hospital interne service and then go into general practice for several years; after this preliminary period the specialty desired might be considered. The necessity of limiting the specialties to men who have put in at least two years in intensive work in that particular subject was emphasized by several writers. There is a feeling that a special licence should be required for any person desiring to practice as a specialist, an arrangement now in operation in Alberta.

CONSULTANT SERVICE

The general report is that there is good consultant service available in all of the large and smaller cities. In the towns the lack of consultant service becomes noticeable. This is most marked in British Columbia where approximately one-third of the returns indicate that there is almost an equal shortage of consultant service in medicine, surgery, pædiatrics, obstetrics and oto-laryngology. When we consider the villages of Canada, we find that in practically all areas, excepting those adjacent to cities and large towns, the replies indicate some scarcity of consultant service. Consultant service in eye, ear, nose and throat seems to be least required. Judging from replies received, consultant service in medicine and surgery seems to be fairly adequate, except in rural British Columbia, Alberta and Saskatchewan and to some extent in rural Quebec.

The paucity of consultation facilities in obstetrics is more noticeable, again to the greatest extent in Alberta, in Saskatchewan, and in Quebec. Pædiatric advice is difficult to obtain in a great many areas in Canada, and the dearth

of consultant service in this specialty is quite noticeable, not only in villages and towns but also in a number of the cities. In the villages of British Columbia and Saskatchewan 50 per cent of the doctors replying stated that there was a dearth of pædiatric consultation service.

HOSPITAL ACCOMMODATION

Every province reports a distinct shortage of hospital accommodation, and, apparently, this is most marked in large cities and in rural areas on the prairie. In view of the fact that, at the present time throughout America, there is a definite swing in hospital construction towards more *private* accommodation, possibly the result of the rising scale of living on the part of the public, it is of interest to know that this survey indicates that the greater need is for more *semi-private* and *public* hospital accommodation.

Insufficient private accommodation—28 per cent of replies.

Insufficient semi-private accommodation—37 per cent of replies.

Insufficient public ward accommodation—35 per cent of replies.

We now have in Canada 898 hospitals, of which 485 are public general hospitals; there are altogether 77,120 hospital beds, of which 36,523 are public general hospital accommodation.

LABORATORY AND X-RAY FACILITIES

Very few complaints concerning the inadequacy of these diagnostic aids were received from the large or small cities, but in the towns, and to a greater extent in the villages, throughout Canada, especially in Alberta and Saskatchewan, considerable lack was reported. It is quite obvious from these replies that one of the major problems in rural practice is to provide modern pathological laboratory and roentgenological facilities necessary to make the finer diagnoses which are now possible. The provision of physical equipment is alone not sufficient and the maintenance of the skilled technical assistance necessary is not always economically feasible.

ANALYSIS OF MEDICAL PRACTICE

The increasing recognition that certain patients should be sent to the hospital is attested by the fact that the doctors replying state that more than twenty per cent of their patients should be sent to the hospitals. The reports indicate that on the whole, these figures are highest in cities. This may be due in part to the decreasing size of city homes and apartments, and to the fact that so many patients going to cities from outside points are taken directly to hospitals as their condition usually requires extensive diagnostic procedure or operation. Of the patients going to general practitioners 7.9 per cent require special examinations for diagnosis or consultation and 7.1 per cent require treatment by specialists. Tabulation by provinces is as follows:—

Province	*Percentage of patients needing:*		
	Hospitalization	*Consultation or special examination**	*Treatment by Specialists**
British Columbia	22.9	8.0	4.3
Alberta	24.9	10.8	6.6
Saskatchewan	17.6	9.2	5.3
Manitoba	24.1	6.2	4.5
Ontario	17.4	6.5	5.1
Quebec	22.1	5.9	4.6
New Brunswick	20.6	11.3	12.9
Nova Scotia	16.1	7.5	5.8
Prince Edward Island	22.0	6.0	15.5
Average for Canada	20.8	7.9	7.1

*Only reports by general practitioners are considered in these two columns. In the first column, replies of all practising physicians and surgeons are included. These indicate the percentage which should go to hospital; the following table shows the percentage which actually goes.

The greatest need for the hospitals is found in the small cities of British Columbia where apparently 37 per cent of the patients require hospitalization. On the other hand, in Quebec villages but 5 per cent are reported as needing hospitalization.

PERCENTAGE SEEN IN OFFICE, HOME OR AT HOSPITAL

The following table indicates the percentage of patients seen by various doctors reporting either at the doctor's office, at the patient's home or in a hospital. The remainder of the patients would be seen at work or elsewhere. The detailed analysis, of which the summary is given here, indicates that there is very little difference in the percentage in city, town or village practice.

Province	*Per cent Office*	*Per cent Home*	*Per cent Hospital*
British Columbia	57	19	16
Prairie Provinces	60	21	16
Ontario	56	26	12
Quebec*	48	29	19
Maritimes	43	31	13

*Majority of replies from English speaking doctors.

PART TWO

Medical Education

When this questionnaire was being compiled it was thought advisable to include a number of questions on medical education. We in Canada are very proud of our medical schools. They have turned out many illustrious graduates in the past, and, judging by the many scientific contributions made by the younger graduates during the last decade, and the increasing number of fellowships and scholarships, and the recognition of Canadian schools by large philanthropic endowments, the future success of our medical schools is beyond question. Our leaders in medical education, both undergraduate and postgraduate, have spared no effort to round out the courses and to fit the young doctor as

adequately as possible for the life work before him.

It was considered that the opinions of graduates who have gone out into practice in rural communities far from the diagnostic facilities, consultation support, and the other aids surrounding the worker in the large urban areas, might be of value to university teachers as an indication of the extent to which the men in the field consider the teaching received has prepared them for actual practice. The great majority of those who responded were quite satisfied with their teaching. Many in foot notes spoke most appreciatively of the work and interest of their teachers; but few subjects escaped the suggestion that more emphasis might have been laid upon this or that aspect of them. In no case can the criticism of individuals concerning medical education be accepted as an indictment of medical education in Canada, but undoubtedly all of our medical institutions will be interested in knowing of any constructive criticism which has been made.

To summarize the many comments received, the subjects on which some graduates thought greater emphasis might have been laid are as follows:—

Art and psychology of medical practice.
Periodic health examinations.
Orthopædics.
Dermatology.
Disorders of the eyes.
Functional nervous disorders.
Medico-legal problems.
Disorders of the ears, nose and throat.
Care and feeding of infants.

Undergraduate subjects receiving most favourable comment are the following:—

Acute respiratory diseases.
Major chronic diseases.
Minor surgery.
Minor medical complaints.
Gastro-intestinal disorders.
Therapeutics.
Pharmacology and the writing of prescriptions.
Obstetrics.
Surgical emergencies.
Gynæcology.

One realizes that some of the criticisms may have been penned without a full realization of the problems facing our college educators or of the aims of undergraduate instruction. On the other hand, many signed opinions were received from men and women with national reputations who appreciate teaching and practical needs and difficulties from both sides of the academic fence. All in all, they present an interesting cross-section of graduate opinion.

It seems to be a difficult matter to provide a type of instruction which will suit everybody, and it is difficult, apparently, to devise a course which will be of equal value as a foundation to both research worker and practitioner. Many practitioners comment on the lack of practical instruction in their early training. A great many express the opinion that they should have had more practice in actually *doing* things.

Some of the comments received discussed at great length the question of *theoretical* vs. *practical* training. Some of the views expressed by many of the older practitioners, which they admitted are based upon the type of teaching prevailing in their own undergraduate days, do not apply to medical education of to-day. Others supported present day undergraduate instruction, pointing out that the university can teach only a limited amount in the fleeting years at its disposal; and if but the fringe of the subject can be touched, it is better to give a sound scientific basis, upon which the practical experience can be erected later, than to give a few practical hints or to turn out skilled technicians without that sound knowledge of the principles upon which all scientific progress is based. As one correspondent writes, "Practical experience may be learned later, but the sound theoretical basis never."

Selection of Students

A number of men write very seriously on the need for a more careful selection of students upon other than academic qualifications. So many factors enter into the success of the physician and the failure of some draws such criticism upon the others that much wider powers of selection are demanded for our colleges and licensing bodies. "We need honest, kindly, sympathetic, doctors of the 'old school'—not conceited snobs, exploiters or easy going bridge or golf fiends." Another writes: "From the patient's standpoint, an honest doctor is worth more than a clever one," and another: "There are just two prerequisites to the making of a doctor, character and a consuming scientific interest."

Ethics

A number feel that their instruction, and, we gather, that of their colleagues, in ethics was neglected. This is reflected not only in their references to their college education but in their allusions to the ethics of medical practice. One of the regrettable observations which one cannot help but make is that some of our colleagues, especially the rural general practitioners, feel, rightly or wrongly, that there is a lack of camaraderie between the members of our profession.

Fortunately, the development of organized medicine, the strengthening of local organizations and county societies, the staff meetings encouraged by the hospitals, the increasing influence of our Canadian medical journals and bulletins, and the increasing attendance at our conventions, have had a most wholesome influence upon this condition, and it is to be anticipated that year by year there will be still greater reason to feel that our profession is nobly maintaining the great traditions handed down to us by our predecessors. The Canadian Medical Association and the provincial associations annually appoint their Ethics Committees, but with few exceptions have these committees of recent years had occasion to

meet. And in view of the increasingly closer interrelationship between medicine and the economic and social development of the nation, this suggestion of a senior and highly respected colleague may be opportune: "Is the time not coming for adding to the code of medical ethics the general discussion of the business principles which underly modern ethical business to-day, in so far as medicine is becoming more and more linked up with the business world?"

OUT-PATIENT TEACHING

A number of medical men in their replies strongly favoured a more prolonged period of training in the out-patient department. This should be of great value to the student since actual practice is far different from the type of work found in the wards of teaching hospitals. "The student must go to the out-patient department to learn how to meet patients and to treat the minor disorders which constitute 70 per cent of his earlier practice."

POSTGRADUATE WORK

The analysis of the reports received shows that 81.5 per cent of all the doctors in Canada replying have taken postgraduate instruction. This is an exceedingly good average when one considers how difficult it is for men in small communities to get away from their obligations. By provinces, Quebec ranks highest with 88 per cent of those replying, closely followed by Ontario (85 per cent), British Columbia (84 per cent), Prince Edward Island (83 per cent), New Brunswick (79 per cent), Nova Scotia (78 per cent), Alberta (76 per cent), Saskatchewan (72 per cent), Manitoba (72 per cent). Analyzing the returns by area groups, the large cities showed the highest percentage, with the village areas showing the smallest percentage.

Postgraduate instruction was pursued in Canada, in United States, in Great Britain and on the continent, and the average percentage returns indicated that the patronage was very well divided. The province of Quebec sent a large number to Paris and other continental centres for postgraduate instruction. Nova Scotia, New Brunswick and Alberta men have taken the bulk of their postgraduate work in the United States. Nova Scotia has sent a large number of men to England and Scotland, and the smallest percentage of all provinces to Canadian centres.

LOCATION OF POSTGRADUATE INSTRUCTION

(Calculated as percentages of number reporting as having taken postgraduate work.)

Country	*B.C.*	*Alta.*	*Sask.*	*Man.*	*Ont.*	*Que.*	*N.B.*	*N.S.*	*P.E.I.*
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Canada.....	32	37	28	33	36	23	54	9	*80
United States	54	71	59	53	54	45	69	50	*40
Great Britain	50	29	40	51	37	35	39	51	..
Continent...	26	7	16	20	15	50	24	9	..

*Limited return.

(As many individuals report having studied in several countries, these percentages total over 100).

In the compilation of this report thanks are due to the many busy practitioners who have taken the time to answer these questions, and also to Drs. E. Stanley Ryerson, H. H. Murphy and A. Grant Fleming, who have very kindly studied the information submitted and made many valuable suggestions in the selection of data for this survey.

THE HISTORY OF VANCOUVER

By W. J. DORRANCE

Vancouver

Vancouver is known as Canada's "Gateway to the Pacific." With the finest harbour in the world, it is undoubtedly the chief deep-sea port on the Pacific Coast. Situated on the southern mainland of British Columbia, on the shores of Burrard Inlet, it is bounded to the south by the waters of the Fraser River and to the north by the snow-capped mountains of the Coast Range. The harbour entrance is known as "The Lions' Gate," being guarded by twin mountain peaks resembling couchant lions. According to Indian legend they watch over the peace and prosperity of the district.

It is only sixty-eight years ago, in 1862, that John Norton, the first white settler, erected his little log cabin and barn in what is now the West End of the city. Three years later Captain Stamp, of Alberni, built the Hastings Mill on the south shore of Burrard Inlet, where it stood until 1929. Around the mill a small community, named Granville, began to grow, and in 1873 the first school was built to meet the educational needs of the children. Negotiations with the Canadian Pacific Railway syndicate in 1884 brought Mr. Wm. C. Van Horne, vice-president and general manager, to the coast to decide on a suitable site for the terminal. The situation of Coal Harbour, as compared with Port Moody, was found so satisfactory that Mr. Van Horne decided upon Granville, at which time he changed the name to Vancouver, in honour of Captain George Vancouver, who had sailed the first ship through the Lions' Gate in 1792.

On April 6, 1886, Vancouver became incorporated as a city with a population numbering 2,000. Two months later it was wiped out by fire. Many lives were lost in the conflagration, while approximately one thousand buildings, valued at $1,300,000 were totally destroyed. However, the faith of the people was undaunted and rebuilding was begun immediately, the first banking institution being opened in the late summer to finance the operations. During this year the preliminary meeting of the Vancouver Board of Trade, with Mayor McLean presiding, took place and the necessity of an adequate

waterworks system was discussed. The first through train from the east arrived in Port Moody on July 4, 1886, and when the line was extended and the first passenger train pulled into Vancouver, ten months later, on May 23, 1887, the city's progress was assured.

The Canadian Pacific Railway Company has played an important part in the development of Vancouver. Following the construction of Canadian Pacific Railway docks for ocean-going steamers in 1887, and the inauguration of trans-Pacific shipping with the arrival of the "Empress" ships, *Empress of India, Empress of China* and *Empress of Japan* in 1891, Vancouver came into prominence as a seaport. To-day these ships are replaced by the magnificent liners, the *Empress of Asia, Empress of Russia* and the palatial *Empress of Japan* which made its maiden voyage only this year. Thus trade with the Orient began, now amounting yearly to millions of dollars.

By the end of 1892 Vancouver had taken a great step forward. Many improvements were undertaken; the first water main across the Lions' Gate was laid, the telephone and electric lighting were introduced, a street railway charter was granted, driveways were extended, sidewalks laid down, and a sewerage system worked out. It is interesting to note that Vancouver published the first paper in Canada printed by electric power. At this time the population reached a total of 15,000. The city comprised 2,700 buildings including the City Hall, Seymour Street fire hall, and a market at the corner of Main and Hastings Streets. The sole industrial plants were a sugar refinery and four lumber mills, from which 30,000,000 feet of lumber was exported during the year.

During 1893-1894, Vancouver felt the general depression which swept over Canada. However conditions began to improve in the early part of 1896, owing to the increased mining development that was taking place in the interior of British Columbia. The machinery and supplies required in the camps improved the outlook among the business houses of the city and led to renewed optimism. The frenzied rush to the gold fields of the Klondike in 1897 and 1898 brought a realization of the possibilities of distant trading and the opportunities of the city as an export centre. The merchants reaped considerable trade from the variegated throng which swept its way to the Yukon through the portals of Vancouver.

With the completion of the cable connection with Australia and the opening of the Panama Canal, Vancouver was beginning to be recog-

View of the business section of Vancouver looking north towards the harbour

From left to right:—Medical-Dental Building; Miller-Court Building; Hall Building; Post-Office Clock; Devonshire Hotel; Georgia Hotel; Court House; Hotel Vancouver; Vancouver Block (with clock); Bekins Building, and B.C. Telephone Building.

nized as a world port and metropolitan centre. Between 1905 and 1913 one of the biggest real estate booms in the history of Canada took place. New residential localities, such as Mount Pleasant, Fairview, and Kitsilano, were built up; commercial, industrial, and shipping improvements followed each other with surprising rapidity. When the Great War broke out in 1914, Vancouver responded creditably, not only sending her men but supplying many of the essentials required by the Allies.

Following the period of post-war re-adjustment, Vancouver has slowly but surely made substantial progress. Her industrial plants now number 2,500. In 1929, her lumber exports amounted to 501,000,000 feet; 74,000,000 bushels were shipped from her grain elevators; and 23,000 vessels carried over 10,000,000 tons of merchandise to 106 distant countries.

To facilitate the enormous export trade the Canadian Pacific Railway Company constructed Pier "B-C" at a cost of $2,500,000. This pier, together with the Ballantyne Pier, gives Vancouver the most modern accommodation for shipping on the Pacific. The harbour has fifty-three berths for ocean-going vessels, including eighteen grain-berths. Forty-two steamship lines and three trans-Canada railways connect Vancouver with every country in the world.

Vancouver is noted for her beautiful homes and the city fathers are taking care that this beauty will continue under the town planning scheme. New residential areas are being constantly opened up, among which is University Heights, where stands the University of British Columbia. The Shaughnessy subdivision, laid out by the Canadian Pacific Railway Company, is very attractive as a residential district, having some of the finest homes and gardens in the city.

The City of Vancouver has a $200,000,000 business section, with many more buildings under construction, chief of which is the Canadian National Hotel. The total assessed value of the city is $400,000,000. The population numbers 300,000 and is increasing year by year. The leaders of industry throughout Canada predict it will be only a short time until the "Gateway of the Pacific" has a population of 1,000,000 people and as the population grows, so will the trade and industry.

With a progressive people, inspired by what already has been achieved and with hope for the future, Vancouver is preparing for increased trade and commerce by air. This year she constructed on Sea Island one of the finest airports on the coast, which will give the city a means of reaching the world other than by sea and rail. Already reputed as the third largest city, Vancouver takes her place beside Montreal and Toronto as one of the most important trade centres in the Dominion of Canada.

MEETING OF THE EXECUTIVE COMMITTEE

The Executive Committee of the Association held its second meeting for the year at the Chateau Laurier Hotel, Ottawa, on November 27th, 1930, with the following members in attendance:—

Doctor A. T. Bazin, *Chairman;* Drs. F. S. Patch, C. J. Veniot, Léon Gérin-Lajoie, L. J. Austin, Geo. S. Young, W. Harvey Smith, J. G. FitzGerald, T. Glen Hamilton, A. Primrose, J. C. Meakins and T. C. Routley.

Drs. G. Harvey Agnew and H. H. Murphy, Associate Secretaries, and Dr. A. G. Nicholls, the Editor of the *Journal*, were also present.

The following summary of the business transacted will be of interest to our members.

PERIODIC HEALTH EXAMINATIONS

Dr. Murphy, Associate Secretary in charge of this Department, reported that, during the year 3,490 requests for examinations had been received, of which 2,448 had been completed; and that 1,350 physicians throughout Canada had participated in this work. A few men asked for by policyholders were unable to carry out the examinations, due to the fact that they are engaged in special practice, while a few others felt that the fee of $4.00 was too small.

In reviewing the work of the year, the Executive Committee voiced the following opinions:—

(1) That the year's experiment had been a success.

(2) That the work should be continued.

(3) That it would be advisable for the work to be organized and conducted by the Insurance Companies, with our Association acting in a consultative capacity only. We shall continue our efforts along educational lines, dealing with this particular subject.

POST-GRADUATE MEDICAL EDUCATION

The work accomplished during the past five years is presented in the following table:—

COMPARATIVE STATEMENT OF POST-GRADUATE WORK

CONDUCTED BY THE CANADIAN MEDICAL ASSOCIATION

Year	*Number of Speakers*	*Number of Addresses*	*Average Attendance*	*Total Attendance*	*Total Cost*	*Cost per lecture per doctor*
1926.....	169	513	29	17,264	$30,100.27	$1.74
1927.....	269	729	27	19,683	28,831.66	1.46
1928.....	329	802	31.7	25,423	33,336.45	1.31
1929.....	379	730	36	26,287	31,257.21	1.19
1930.....	300	580	38	22,036	27,961.78	1.27
Total....	1,446	3,354	32.3	110,693	$151,487.37	$1.39

The Executive Committee learned with distinct pleasure that the Sun Life Assurance Company had made us a sixth grant, in the sum of $30,000, to carry on this work for another year. This means that, in all, the Sun Life Assurance Company has given us the magnificent sum of $180,000 for post-graduate medical education.

Expressions of opinion from all parts of Canada indicate most clearly that this service is highly appreciated by the profession at large.

PUBLICITY AND HEALTH EDUCATION

The Canadian Life Insurance Officers Association has very kindly voted us a second grant of $6,000 to carry on our newspaper work for the ensuing year. The Department reports the receipt of more than one hundred letters a month from readers of our health articles, each one of which is answered personally by Dr. A. Grant Fleming, the Associate Secretary in charge. Our thanks are extended to the Canadian Life Insurance Officers for their generous support.

NARCOTIC DRUGS

The Executive Committee decided to render all the support within its power to the Department of Pensions and National Health, Canada, in its fight against the vicious and vexatious problem of drug addiction. At the present time, there are 6,000 drug addicts in Canada. The Government has very definite means of controlling the importation of narcotic drugs for lawful use, but the problem of controlling the illicit sale of opium and its derivatives among addicts in the underworld is causing them much concern.

DEPARTMENT OF HOSPITAL SERVICE

Dr. G. Harvey Agnew, Secretary of this Department, reported as follows:—

There appears to be a growing desire throughout Canada for the establishment of a Council on Hospitalization, which will act as a clearing house for general and interprovincial hospital problems. The advisability of establishing such a Council is to be considered by the Hospital Department. Your Executive Committee most heartily approved of our Association supporting the hospitals throughout Canada in every way within our power. We are deeply indebted, again, to the Sun Life Assurance Company of Canada who have financed this Department for the past three years, having supplied all the funds to the extent of $45,000. The service being extended to the people of Canada, through the hospitals, presents a very worthy avenue for the expenditure of money, and we are deeply sensible of the wonderful support which the Sun Life is giving to this work.

In addition to giving practical aid to all the hospitals requesting it, the Department is interesting itself in the placing of internes and the very practical question of tariff, as relating to hospital supplies. Indeed, in this connection, through our efforts, a revision of tariff has been secured which means an annual saving of many thousands of dollars to the hospitals of Canada.

THE WINNIPEG MEETING

Dr. W. Harvey Smith, our President, who, along with his Winnipeg Committee, achieved such distinct success in handling the meeting of the British Medical Association in Canada last August, reported that the books had been closed with a credit balance of $513. The records show that all funds associated with the handling of the meeting, both in Winnipeg and through the general coffers of the Association, exceeded $90,000. A very hearty vote of thanks was accorded Dr. Smith and his Committee, on behalf of the Association.

THE VANCOUVER MEETING

Next year, the Association is to meet in Vancouver, during the week of June 22nd. The Executive Committee learned with distinct satisfaction and pleasure that plans are already well under way for what we are sure will prove to be a very successful convention.

TORONTO, 1932

It was definitely decided that the annual meeting in 1932 will be held in the Royal York Hotel, Toronto, on June 20, 21, 22, 23 and 24. It was necessary to decide upon the dates at this time owing to the fact that the hotel selected is in great demand for convention purposes.

"ON TO ENGLAND"

A Committee, composed of Drs. W. Harvey Smith, A. T. Bazin, and the General Secretary, was appointed with instructions to develop plans which, we hope, will lead to a successful pilgrimage to England in 1932, on the occasion of the centenary of the British Medical Association. It is proposed that the party will proceed to England together, tour the British Isles, attend the great convention in London, and then, those who desire may follow their individual plans while the remainder of the party return home. Members who are interested in making this trip are asked to send their names in to the General Secretary.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The executive Committee decided to invite the Royal College of Surgeons of England to hold its primary examination for Fellowship, in Toronto in the autumn of 1931. Word has been received from the College that arrangements will be completed to this end.

WESTERN PROVINCES ANNUAL MEETINGS

The Committee decided to send a team of speakers to address the annual meetings of the three Western Provinces next autumn, the dates and choice of speakers to be worked out to the mutual satisfaction of all concerned.

THE PRESIDENT'S BADGE

The Committee was very pleased to accept the kind offer of Dr. John Ferguson, of Toronto, to provide the Association with a President's Badge after the fashion of the badge worn by the President of the British Medical Association. Dr. Ferguson hopes to present this badge personally to the President at the meeting in Vancouver next June.

NEW SECTIONS IN THE ASSOCIATION

Letters having been received from the Canadian Tuberculosis Association and the organization of military medical men in Canada petitioning for the formation in the Association of sections of Tuberculosis and Military Medicine, respectively, the Executive Committee was glad to give approval to the formation of such sections.

A great many other matters of perhaps lesser importance, along with the foregoing, provided a very heavy agenda for your Committee, which was in session for more than twelve hours.

In reviewing the work of the past year, your Committee feels that we have reason to be proud of much that has been accomplished, and we look forward hopefully to the year 1931 as a further opportunity to serve the medical profession and, indirectly, the public of Canada.

Hospital Service Department Notes

THE BUSH NURSING MOVEMENT IN AUSTRALIA

"The centre of every man's existence is a dream" and Sir James Barrett, K.B.E., C.B., C.M.G., M.D., of Melbourne, one of the distinguished delegates to the recent British Medical Association meeting in Winnipeg, provides no exception to the rule. He is the Honourary Secretary of the Victorian Bush Nursing Association and presented a very interesting account of this unique movement, the object of which is to provide, gratuitously or otherwise, trained district nurses and other requisites and attention for sick and injured persons in country towns and districts.

This bush nursing service was organized to meet a special need in the pioneer country and for that reason is of interest to those concerned with the health problems of our own Canadian frontier. Founded in 1910 by the Countess of Dudley with the active support of Lord and Lady Carmichael, the first Centre was opened at Beech Forest and others quickly followed, until by 1923 there were 47 Nursing Centres. Up to this time the movement was entirely one of providing nursing service to the settlers, no hospitals being built. However, in 1923 a Country Ambulance Service was formed and hospital construction was initiated. By 1926, the Centres had increased to 52, of which 8 were Hospital Centres, and the number of Country Ambulances had reached 18, many of these being equipped for horse-borne transport. This year they have achieved the excellent record of 69 Centres including 25 hospitals and the Country Ambulances have increased to 22. Five more hospitals are in process of organization.

Except in cases of emergency sick nursing is carried out under the direction of the medical practitioners. The local doctors are invited to join the Committee of Management, patients select their own practitioner and the cooperation is excellent. The Nursing Centres are all run on the cooperative basis and, with the exception of two hospitals in drought-areas, have been self-supporting without government aid.

The basis of support is simple. A householder pays a subscription of 30/ a year (or more) and for that sums obtains *nursing* for himself, his wife and family up to the age of 18 years for the whole year. A special charge of 30/ is usually made to members for maternity cases. The subscription rate, usually 30/, varies in the various districts from £1 to £3/10/- per annum, each district fixing its own rate. Non-members are charged full professional fees, and are required to sign the indemnity form provided before they can obtain the services of the nurse.

The Bush Nursing Hospitals, it is hoped, will furnish the solution to the problem of medical attendance in the country. These hospitals, owned and controlled by the Centres, are available to all who need them at fixed rates. The medical practitioners visiting the hospital are ex-officio members of the Committee of Management.

The charges in the Bush Nursing Hospitals, fixed by the local committee in each Centre, are usually as follows:

Members—General cases, per week	£2	10	0
Midwifery cases, 10 days or two weeks	£5	0	0
Non-members—General cases, per week	£5	0	0
Midwifery cases, per week ..	£5	5	0

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, Secretary, 184 College Street, Toronto.

Incidentally, thirteen of these hospitals paying their way at this rate were formerly privately operated hospitals which had failed at much higher rates.

The local committees agree to pay the salaries and maintenance, and the Central Committee pays for organization, inspection, relief staffs when not in the field, annual report, etc., and helps the local committee in unusual circumstances. Many of the nursing centres have provided a cottage for the nurse.

The work of the nurse in the Centre varies, but by far the greater part of the work, and the more important, is that of midwifery and the care of infants and children, all the nurses being qualified midwives. Incidentally this qualification was made possible through the generosity of the Edward Wilson ("The Argus") Trust, which gave nurses a salary of £50 during their six months' midwifery course on condition that they serve the Association for a stated period thereafter. The Association is proud of the fact that while the maternal mortality rate for the state as a whole is 4.80, that for the Nursing Centres is but 1.94 per thousand. In hospital centres the first duty of the nurse is to attend the patients in hospital and, as time permits, also to visit the schools where she examines children and gives instruction on hygiene, first aid, etc. In Bush Nursing Centres the nurse visits the patients requiring her services, but in Hospital Centres it is not usual for the nurse to attend outside cases except under special circumstances.

This system of providing health care, in which Sir James Barrett has taken such a deep interest, has been very successful in its operation, meeting the needs of the districts, proving satisfactory to the medical profession, and not pauperizing the people. "The policy adopted by the Association is to help districts which are making a determined effort to help themselves." Certain features of this development are somewhat akin to the work of the Victorian Order nurses, to the Red Cross outposts, or to the "subscriber" system of hospital support here in Canada. Many features of this work could well be applied to Canada, although the licensing of nurses or others as midwives has never received favourable consideration in this country.

BUILDING UP THE MEDICAL SERVICE IN A HOSPITAL

Too many hospitals are top-heavy with surgical cases and lack a proper proportion of medical cases. While most of our hospitals are busy, there are a fair number with many idle beds, especially in the summertime, and these empty beds represent a real loss of revenue. The hospital averaging a census of but 60 per cent is losing many thousands of dollars annually, and one method of bringing up this census is to develop the often neglected medical services in the hospital. Emphasis is laid on this point by Wm. J. Finn, a lay superintendent from Maryland, writing in a recent issue of *Hospital Management*.

In many hospitals the medical service is weak because the hospital is not interested in its medical men. "For the surgeon, we maintain elaborate operating rooms, we sterilize, we store thousands of dollars in supplies, we bring in trained anæsthetists and high priced equipment, we special their cases after an operation, we practically throw the entire hospital at their feet. And still there are 25 or 30 medical men in town, each with 25 or 30 cases that should be in the hospital for study, if not for treatment."

Various measures are suggested to build up the medical service. A *diagnostic service* is recommended and it is suggested that arrangements be made whereby a maximum fee of $50 for a two-day study be established. "Why not do a little catering to the medical man? Why not tell him that he may bring in any case he wishes for diagnosis and study it for two full days, using the x-ray and clinical laboratories, the services of the x-ray man and the pathologist, and that the entire charge to the patient for the hospital services will be $50?" Treatment will follow diagnosis in many cases; the x-ray department and the clinical laboratory will not know themselves with increased activity. The nursing school will be able to offer to students what it never offered before.

Chronic medical cases should not be eschewed as they usually are. A special rate might be prepared giving them a slight reduction in charges. In slack seasons this would benefit the hospital and would be of considerable benefit to the patient.

Few 100-bed hospitals have an active *urological department* with a cystoscopic room and table. Perhaps they have never realized how many of this type of case there are. The writer suggests a 24-hour cystoscopic examination, including x-ray, board and care, for a week with definite charges for further work and longer admissions. It is a case of conceding a little revenue to gain cooperation between the hospital, the doctor and the patient, with all reaping an advantage, especially the patient.

The *obstetrical department* may often be developed to a much greater extent, and the flat rate is strongly advocated as an excellent means of stimulating public patronage. "A flat rate will build up a lagging obstetrical department faster than anything else." It is suggested also that a variety of other cases and services might

be considered, such as mild mental cases, diet regulation cases, orthopædic cases, rest cure cases and pædiatric cases.

It is estimated that an average 100-bed hospital, running at 60 per cent capacity, might reasonably anticipate the following gains by proper reorganization:

Acute medical cases	10
Diagnostic cases	5
Obstetrical cases	5
Chronic medical cases	5
Assorted	15

INTERESTING TOPICS DISCUSSED AT THE NEW ORLEANS HOSPITAL MEETING

The old city of New Orleans, with its quaint "vieux carré" dating back to the French régime, its southern hospitality, and its famous Creole dishes, entertained the American Hospital Association at its 1930 convention in October. Considering the distance, a surprisingly large number of Canadian hospital people maintained their annual attendance at this important gathering. A luncheon meeting of the Canadian hospital administrators present permitted a valuable discussion of many of our essentially Canadian problems.

"There are many instances where hospitals have spent their funds for expansion not warranted by community needs rather than in refinement of service and in better organized care of patients," said Dr. C. S. Parnall, the President, in his inaugural address. He emphasized the need for economy in all hospital developments. Mr. Julius Rosenwald, the well known philanthropist, pointed out that charitable gifts alone would not suffice to distribute medical care to the general public. "Either the state will have to take responsibility for the medical care of its citizens . . . . or else physicians, hospital managers and representatives of the general public must unite to find the best methods whereby people will get good medical care at a fair price."

A warning for hospital and medical workers to assume the leadership in the quest for a more economical method of caring for the sick came from many quarters. Governor Graves of Alabama said: "We are going to have it. We want it under your leadership, but if you don't captain the bridge, somebody else will." Dr. Stewart R. Roberts, of Atlanta, said: "The profession must become socially conscious and develop leadership and reorganization. Otherwise the demands for medical service and social progress will eventually cause leadership to arise outside the profession, under private or public control."

The discussion concerning the relative economy of graduate versus undergraduate nursing in hospitals occupied considerable time. It soon developed, as it has in previous discussions, that the comparison of data is exceedingly difficult owing to the lack of uniformity in methods of calculation. The most convincing contribution offered was that of a comparative study of a group of New York hospitals. This revealed that the cost of nursing per patient-day with undergraduate nurses in this group was exactly $2.00; with graduate nurses the cost was $2.53.

Group nursing elicited considerable attention and was reported upon favourably by several hospitals, although there was not uniform approval of this method of reducing the cost of sickness. It was very pointedly brought out that one difficulty in making this arrangement self-sustaining has been that the staff doctors as a whole have not patronized this service. Full cooperation and support have been essential.

Various methods of operating flat rates for laboratory charges were introduced at one of the round tables. One Milwaukee hospital charges 20 per cent of the room rate daily to the tenth day; tonsil cases are excepted and maternity patients pay but 10 per cent. This has proved satisfactory, both to the patient and to the hospital. Another hospital charges all but maternity cases five dollars for laboratory work. A record is kept and when over fifteen dollars' worth of laboratory service has been rendered, another five dollars is charged.

History taking and case records came in for considerable criticism. As might be anticipated, the tardiness of some of our colleagues in attending to their secretarial obligations came under caustic review, but there were not lacking others who pointed out that the hospitals were under equal obligation to provide more than the barest facilities which is all that is done in most hospitals at the present time.

The medical schools were severely criticized for not teaching history-taking to the medical students, a factor which, it was claimed, would help to explain the lack of interest of the profession in their records. A resolution requesting the medical schools to pay more attention to this feature was introduced by one of the delegates. This alleged state of affairs was of interest to the Canadian delegates for few graduates of our medical schools can feel that their apprenticeship in the art of history-taking was neglected or curtailed.

At the round table on medico-administration there was a lengthy consideration of medical staff organization and of appointments and promotions thereon. There seemed to be agreement that appointments should be annual, thus minimizing the embarrassing duty of requesting occasional resignations. Staff meetings should

be open to all doctors attending the hospital; attendance should be insisted upon; and the program should centre around work actually being done in the hospital. General papers, except those reviewing the work in the hospital, should be reserved for the meetings of the county association or other medical societies.

HOSPITAL PHARMACISTS MUST BE REGISTERED IN NOVA SCOTIA

Information has been received that the hospitals in Nova Scotia must henceforth employ a registered pharmacist to be in charge of the hospital dispensary. The examinations set for hospital pharmacists shall be apart from those set for candidates writing the examinations for registration as certified clerks or as pharmaceutical chemists.

The sections of the revised Nova Scotia Pharmacy Act of interest to doctors and hospitals are the following:

11. There shall be three classes of examinations held by virtue of the provisions of this Act: (a) For registration as certified clerks to pharmaceutical chemists; (b) For registration as pharmaceutical chemists; (c) For registration as hospital pharmacists.

13. (Subsection 3) Every candidate who desires to be examined for registration as a hospital pharmacist shall produce to the council satisfactory evidence that he has passed all other prescribed examinations or has been exempted therefrom. He shall before his examination pay to the registrar the fees provided for under the by-laws or regulations of the Society.

14. (Subsection 1a) Every person who passed the examinations for registration as a hospital pharmacist and complies with the regulations of the Council shall, on payment to the Registrar of such fee not exceeding ten dollars as the Council determines, within six months from the time of passing such examinations, be entitled to receive a diploma as a hospital pharmacist under the seal of the Society.

16. (Subsection 1) Every duly qualified medical practitioner registered as a pharmaceutical chemist under this act on the 30th day of May, 1921, shall be entitled to be so registered from year to year. (2) Medical practitioners shall not be required to take further instruction or to pass examinations in subjects in which they have passed equivalent examinations in their medical course.

18. (Subsection 1) No person except a pharmaceutical chemist or a certified clerk in his employ and under his supervision shall be authorized to sell the poisons, drugs or medicines included in the schedules of this chapter. (2) No person except a pharmaceutical chemist or a certified clerk in his employ and under his supervision, or a hospital pharmacist, shall be authorized to compound or dispense drugs for medicinal purposes.

24. (Subsection 1) Nothing in this Act shall prevent any person whatever from selling goods of any kind to any pharmaceutical chemist or duly qualified medical practitioner, dentist or veterinary surgeon, nor shall prevent the members of such professions supplying to their patients such medicines as they may require, nor interfere with the business of wholesale dealers in supplying poisons or other articles in marked packages in the ordinary course of wholesale dealing; provided, however, that every laboratory in which drugs and medicines are compounded for sale, either by retail or wholesale, shall be under the personal superintendence of a pharmaceutical chemist.

TARIFF ITEMS CONCERNING HOSPITALS

When the Honourable Mr. Bennett summoned Parliament for the Special Session in September there was some doubt as to whether the revisions in the items affecting hospitals passed last spring would be jeopardized, in common with a number of other tariff items. However, the special items dealing particularly with hospital equipment were largely unchanged, except that chloroform was taken from among the articles specified in item 476b and given a special heading (476c) of its own. This drug is retained on the free list, although subject to sales tax. Some of the other equipment used in hospitals is subject to a higher rate. For instance, dishwashing apparatus is listed at 35 per cent ad valorem on the general tariff, instead of 25 per cent; electro-plated baby incubators are charged 45 per cent instead of 35 per cent; and considerable other equipment and supplies will be affected directly or indirectly by these changes. Extension apparatus, electro-plated, which has been ruled not admissible as surgical equipment, is now dutiable at the rate of 45 per cent instead of 35 per cent. Fortunately, most of this equipment is not purchased in large quantities by the hospitals.

In order to familiarize the hospitals of Canada with the details of the concessions made within the last year or two, a small booklet has been prepared by the Department of Hospital Service. This booklet contains the most recent information on this subject and has been distributed to all of the public hospitals of Canada. Additional copies may be obtained by writing to the secretary of this Department.

USES AND LIMITATIONS OF SKIN TESTS IN ALLERGY.—In recent years the use of protein skin tests in the etiological diagnosis of allergic disease has become increasingly popular. Because of the inherent difficulties and limitations of these tests, much disappointment and criticism have resulted, according to Samuel M. Feinberg. Sensitization tests should be considered only as laboratory guides. There are many limitations to the value of skin tests in allergy. Negative skin tests do not necessarily mean an absence of sensitization in these substances. Positive tests do not necessarily indicate the cause of the clinical symptoms. Complicating factors may be more important than the allergy. The difficulties may be met chiefly by employing, when necessary, other methods of testing, such as intracutaneous, subcutaneous, conjunctival, nasal and passive transfer; by clinical trials and elimination diets; by a broad knowledge of the clinical correlation and clinical experience in allergy; and by a willingness on the part of the clinician to consider other causes than allergy.—*J. Am. M. Ass.*, Nov. 29, 1930, **95**.

Provincial Association Notes

MEDICAL SOCIETY OF NOVA SCOTIA

EASTERN COUNTIES BRANCH

The Eastern Counties Branch of the Medical Society of Nova Scotia held its ninth annual meeting at St. Martha's Hospital, Antigonish, on October 14th. Visiting speakers were Hon. Dr. G. H. Murphy, Dr. H. B. Atlee, and Dr. Ralph P. Smith, of the Dalhousie Faculty of Medicine. Dr. Murphy's paper was entitled "Surgical commonsense". Dr. Atlee dealt with the "Delayed case of labour", and Dr. Smith discussed "Vaccines", with particular reference to their therapeutic uses. Dr. R. F. MacDonald, in his presidential address, discussed what the general practitioner may do in dealing with foreign bodies in, and injuries to the eye. The annual dinner was served at the hospital and was greatly enjoyed. Dr. H. C. S. Elliot, of Guysboro, was elected *President* for the ensuing year, with Drs. M. G. MacLeod, of Whycocomagh, and P. A. McGarry, of Canso, as *Vice-presidents*. Dr. P. S. Campbell, of Port Hood, was re-elected *Secretary*.

HALIFAX BRANCH

A largely attended clinical meeting of the Halifax Branch of the Medical Society of Nova Scotia was held at the Nova Scotia Hospital on November 12th. Dr. F. E. Lawlor presented interesting cases of dementia præcox and dementia paralytica, showing a case of the latter condition which had improved greatly under treatment by malaria and discussing his experience with this form of treatment, which has in several cases been gratifying.

Dr. Hopgood showed several cases of melancholia, and followed with a very interesting paper on the mental disturbances associated with the puerperium. The Society passed a resolution expressing regret at the illness of Dr. Morton, assistant medical superintendent of the hospital, and hope for his speedy recovery. After adjournment the Society was entertained at a delightful supper.

"Recent advances in the biochemistry and pharmacology of the internal secretions" were discussed in a very interesting and instructive manner by Drs. E. G. Young and N. B. Dreyer at a meeting of the Halifax Branch of the Medical Society of Nova Scotia held at the Dalhousie Clinic on November 26th. Drs. Young and Dreyer are respectively Professor of Biochemistry and Professor of Pharmacology at Dalhousie University, and they impressed their hearers not only with their ability to present technical matters in lucid language but also with an exceptional capacity for delightfully harmonious disagreement.

W. H. HATTIE

CUMBERLAND COUNTY BRANCH

The Cumberland County Medical Society held its annual meeting at Highland View Hospital, Amherst, N.S., on October 20, 1930. Drs. R. St. J. Macdonald and Seng of Montreal, and D. Murray, of Tatamagouche, the President of the Medical Society of Nova Scotia, were visitors. The attendance was excellent and the meeting very much enjoyed.

Both an afternoon and evening session were held, supplemented by a "Get together" session at the Terrace Hotel when the visiting doctors, the speakers and out-of-town men were guests of the medical fraternity of Amherst. The lectures were highly instructive. Dr. Murray's presentation of the continued need of the general practitioner particularly in country districts for post-graduate medical education was an appreciation of the Canadian Medical Association post-graduate lecture course which was fully endorsed by every member present.

Officers for the coming year were elected as follows: *President*, Dr. A. H. L. Simpson, Springhill; *Vice-president*, Dr. F. L. Hill, Parrsboro; *Secretary-Treasurer*, Dr. W. T. Purdy, Amherst.

Representatives to the Executive of the Medical Society of Nova Scotia, Dr. M. J. Wardope, Springhill, and Dr. A. E. MacIntosh, Amherst.

THE CAPE BRETON COUNTY BRANCH

The opening meeting of this Branch for the season was held on October 23, 1930, at the Isle Royale Hotel, Sydney, under the presidency of Dr. A. K. Roy, of North Sydney, N.S. The meeting began with a banquet, the chief visitors being Dr. W. G. Morgan, President of the American Medical Association, Prof. R. St. J. Macdonald, of McGill University, and Dr. M. I. Seng, of the staff of the Royal Victoria Hospital, Montreal. The toast list was short but brought forth good speeches. After the toast to the King, Dr. Tompkins proposed The Canadian Medical Association, to which Professor Macdonald responded. Dr. Seng then proposed The American Medical Association, to which Dr. Morgan responded.

Dr. Macdonald dealt with "Recent advances in preventive medicine," taking up each communicable disease, pointing out present methods of control and prevention.

When speaking after the address of Dr. Macdonald, Dr. Morgan emphasized the ab-

sence of disease in places where pasteurized milk only is sold. He mentioned the report of the Toronto General Hospital that among all patients treated for gland and bone tuberculosis, none were from the city of Toronto. All milk in Toronto is pasteurized, these patients all come from surrounding districts where no such regulation exists.

Dr. Seng addressed the meeting on the subject of "Renal infections." Very briefly, but clearly, he reviewed the pathology of diseases of the kidney, pointing out the routes of infection and the natural formation of perinephritic abscess. He dealt with the symptomatology and treatment of abscess, pyelitis (colon bacillus infection) and renal tuberculosis. His address was illustrated by lantern slides.

A Resolution *re* Tuberculosis, moved by Dr. J. K. McLeod and seconded by Dr. J. J. Roy, was passed unanimously to the following effect:—"That the Cape Breton Medical Society Branch of the Medical Society of Nova Scotia goes on record as being of the opinion that the establishment of sanitaria in other parts of the province for the treatment of tuberculosis would be more effective in preventing and controlling this disease."

LUNENBERG—QUEEN'S BRANCH

A regularly called meeting of this branch of the Medical Society of Nova Scotia, was held on October 24th, 1930, at Bridgewater, N.S. Visitors were Drs. R. St. J. MacDonald, of Montreal, M. I. Seng, of Montreal, and Gerald R. Burns, of Halifax.

Dr. R. St. J. MacDonald, Professor of Hygiene and Public Health of McGill University, took as his subject,—"Recent advances in preventive medicine." "Communicable" is a better term to use than "contagious" or "infectious", being more scientific and applicable to all diseases usually considered in any public health discussion. In all these diseases the great question is immunity, along which line most research work is proceeding at the present time.

The Common Cold is the cause of 45 per cent of absenteeism in modern industry. The germ or germs are still unknown and various vaccines are used, about 50 per cent being of value for immunization purposes.

Diphtheria. It is clearly the duty of physicians to advise the immunization of all children, especially those between 6 months and 6 years of age. Three doses three weeks apart will secure immunity in 95 per cent of children exposed. This is an opening for the physician to treat children of the pre-school age; otherwise they may come to the school doctor or the health officer.

Scarlet Fever. Here we are not so positive as to the value of our present methods of immunization, but it is acknowledged that attempts should be made to immunize all nurses and attendants.

Tuberculosis. Attention is still directed to efforts towards immunization especially those employed by Calmette. The physician should insist that pasteurization is our chief agency in combating gland and bone tuberculosis. Not even certified milk is regarded as sufficiently safe.

Smallpox. It is quite apparent that laxity has entered into the enforcement of the vaccination regulations. In view of the development of certain nervous complications it has been decided in England not to vaccinate when poliomyelitis or other nervous affections are present. Vaccinations should be made early, from the 2nd to the 6th month. There should be very little scratching and no dressings should be used. The "Conscientious objector clause" in the Regulations should be rescinded and vaccine should be properly kept.

Infantile Paralysis is spread by direct contact or transmission by ingestion. A serum for treatment is now available that can be kept for a space of three years. A very excellent report on the transmission of the disease has been issued by the Health Department of Manitoba. The after care, massage, etc., is very important.

Measles should be regarded as a serious disease. Immunity for 5 to 8 weeks can be secured for children who are ill, but most dependence is placed on adult serum for protection.

Whooping cough.—Active immunity may be obtained by giving injections of vaccine.

Undulant fever is a major problem. It is stated that 30 per cent of cows in some districts are infected. The disease is not common in children under puberty, but is met with frequently among those who work with animals and their carcasses. The first step is to pasteurize all milk, or at least it should be boiled. Boiled milk loses none of its virtues in the boiling. Workmen should wear rubber gloves when working about cows, goats, etc. Every effort should be made to eradicate the disease in cows.

Rabies.—The general practitioner should at once treat the bite with fuming nitric acid, this to be followed later by protection doses of serum against tetanus.

Preventive pædiatrics.—Here is now a large opening for the pædiatrician, 50 per cent of the work being to give advice to mothers. The people are beginning to ask that their children be kept well.

An interesting discussion followed Dr. Macdonald's address, several of the doctors having recently seen cases of poliomyelitis.

Dr. Gerald R. Burns, Halifax, of the staff of the Victoria General Hospital, presented a paper on "Heart conditions that may simulate the acute abdomen."

Dr. M. I. Seng, of the Royal Victoria Hospital, Montreal, gave the third paper of the session, his subject being "Renal infections". He outlined the pathology of the kidney, pointing out the routes of infection, all being blood borne. He dealt with perinephritic abscess, acute pyelonephritis and tuberculosis, their symptomatology

and treatment. Dr. Seng lauded the real old fashioned linseed meal poultice, to the delight of some of the older men present. His lecture was illustrated by lantern slides and was much appreciated.

The visiting doctors were entertained at dinner by Dr. Rehfuss and left Bridgewater for Yarmouth by the Saturday morning train.

THE VALLEY BRANCH

The semi-annual meeting of the Valley Medical Society met in Acadia University, Wolfville, N.S., on Tuesday, October 28th, 1930, at 3 p.m., with Dr. Sponagle in the chair.

Dr. H. B. Atlee, of Halifax, read a paper on "Puerperal infections and their treatment," illustrated with lantern slides, which was accorded an excellent discussion.

Dr. M. I. Seng, of Montreal, discussed "Renal infections."

The third and last paper of the afternoon was presented by Dr. R. St. J. MacDonald, of Montreal, on "Recent advances in preventive medicine." Dr. MacDonald took up in detail diphtheria immunization, and discussed fully the most recent work done in regard to scarlet fever, measles, smallpox, anterior poliomyelitis, and undulant fever. In regard to the last mentioned disease this was transmitted by raw cow's milk, and in some districts many cows were affected. He urged the pasteurization of milk, especially for children under two years. In regard to the subject of active immunization against tuberculosis, the prophylactic value had not been definitely proved.

The banquet was held at Evangeline Inn, about thirty members being present.

The evening session was called to order by the President at 8 p.m. The first address was given by Dr. R. St. J. MacDonald, on the "County Health Clinic". The speaker explained in a very forceful manner the work that was being done throughout Canada, and yet how far behind some of the Provinces were in failing to grapple with this important subject. Both of Dr. MacDonald's papers were thrown open for discussion, and a great many vital questions were asked and answered in connection with contagious diseases, as well as the county health unit.

The second paper of the evening was by Dr. Seng, on "The significance of blood in the urine." The speaker discussed stone in the kidney, ureter and bladder, also foreign bodies in the bladder; tumours of the kidney, and tuberculosis of the kidney. From statistics that had been taken along these lines, they had found that tuberculosis, stone and tumours constituted 70 per cent of the causes of blood in the urine. Dr. Seng stressed the danger of using glass catheters, and told of cases where they had broken, and spoke of the difficulty of removal.

The last speaker of the evening was Dr. Atlee, his subject being "The handling of a difficult case of labour." This was listened to with great interest, and both Dr. Seng's and Dr. Atlee's subjects brought forth a full discussion, concluding another very successful meeting of the Valley Medical Society.

Medical Societies

HALTON COUNTY MEDICAL SOCIETY

The Halton County Medical Society met in Milton on November 25, 1930, with Dr. M. E. Gowland, President, in the chair. This is one of the county societies which has difficulty in holding regular meetings on account of there being no large centre in the county. The last meeting of the society was successful from every standpoint. There are five towns in this county, including Oakville, Burlington, Milton, Georgetown and Acton, and on this occasion, every town was represented and the district lying north of Dundas Street, which includes by far the greater part of the county, had an attendance of all but two of its members, which is a record to date.

Dr. M. E. Gowland presided and acted as host for the evening, the dinner being held at the Milton Inn. Probably the attendance may have been greater out of courtesy to Dr. Gowland, but, on the other hand, an excellent scientific program was furnished.

Dr. W. K. Colbeck, Counsellor for the district, was present, and, in addition to representing the Ontario Medical Association, he gave a splendid address on "The use of rectal anæsthesia in surgery."

Dr. A. D. Unsworth, of Hamilton, presented a paper on "Cardiac disease in relation to general practice." This paper also proved to be of great interest.

Dr. R. M. Janes, of the staff of the Toronto General Hospital, was also present and gave an illustrated address on "Surgery of the chest." Dr. Janes had just returned from Port Arthur where he had given the same paper at the District Conference. His address was very interesting and the slides were so very well prepared that all present were delighted. The opinion expressed on all sides was that this had proved to be one of the best medical society meetings that the members had had the privilege of attending.

ESSEX COUNTY MEDICAL SOCIETY

The annual dinner of the Essex County Medical Society was held at the Essex County Golf and Country Club on December 3rd, with an attendance of sixty-nine.

Dr. McCabe, of Windsor, proposed a toast to the Medical Profession to which Dr. Young, of Windsor, replied. These addresses were of a high order reviewing the history of medicine from an early date. Dr. Laing, the President, proposed the toast of the Ontario Medical Association to which Dr. Ward Woolner, of Ayr, the President of the Association, replied. Dr. Woolner reviewed the work of the various committees of the Ontario Medical Association and stressed the desirability of a survey of the medical services in every district, with a view to arriving at the cost of medical care per family, the capital expenditure of each doctor, and the amount of work he is doing without any recompense.

Dr. Robb, President of the Wayne County Medical Society, brought greetings from Detroit and Michigan, and said ours were their problems, only theirs seemed harder to solve. Dr. Robb is an Ontario boy by birth.

Dr. William Sherwood Fox, President of the University of Western Ontario, gave his address on "I go afishing". His talk was very interesting, full of humour, and from it he drew many lessons which should have sunk deeply into the minds of the doctors present.

All in all, it was a most interesting medical gathering.

THE EDMONTON ACADEMY OF MEDICINE

A unique meeting of the Academy was held on November 26th, to which the wives of the members were invited, and also the members of the Edmonton Museum of Arts and the Edmonton Art Club.

This was the occasion on which the bronze statuette of Dr. Tait Mackenzie's masterpiece, "The Athlete", was presented to the University of Alberta by the Academy of Medicine. The presentation was made by Dr. R. G. Douglas, President of the Academy, and the gift was received by Dr. R. C. Wallace, President of the University, in a gracious and appropriate speech.

Four brief addresses followed, Dr. Heber Jamieson taking up the life of Dr. Tait Mackenzie; Prof. Burgess, "Classical Sculpture"; Prof. James Adam, "Mediæval Sculpture", and Major Frank H. Norburg, himself a sculptor, spoke on "Modern sculpture and its tendencies."

The statuette, which is 18 inches high and a beautiful work of art, will be placed in the library of the University Medical building, where it can be seen and where, as so well expressed by President Wallace, it will, to students of to-day and generations to follow, hold up the ideal of beauty and perfect physical health.

T. H. WHITELAW

University Notes

Aberdeen University

Sir Arthur Keith, M.D., LL.D., Curator of the Museum of the Royal College of Surgeons, was elected, on November 8th, Rector of Aberdeen University for the coming three years in succession to the late Earl of Birkenhead. Sir Arthur Keith stood as a non-political candidate against Colonel John Buchan, M.P., who was put forward by the Aberdeen University Unionist Association. Sir Arthur is a native of Aberdeenshire, and received his education at Robert Gordon's College, Aberdeen, and at Aberdeen University. It is the first occasion in its history that Aberdeen University has had at the same time a Chancellor—Lord Meston of Agra and Dunottar—and a Rector who are both alumni of the University.

Appointments to two Chairs in the University of Aberdeen are announced. Dr. James Ritchie, at present Keeper of the Natural History Department of the Royal Scottish Museum, Edinburgh, succeeds Sir Arthur Thomson as Regius professor of natural history, and Dr. David Campbell, M.C., Pollok Lecturer in pharmacology and therapeutics in the University of Glasgow, succeeds Professor C. R. Marshall in the Regius Chair of materia medica.

McGill University

Prof. E. G. D. Murray, who has recently been appointed to the Chair of Bacteriology at McGill University, in the room of Prof. F. C. Harrison, is a South African by birth. In 1912 he received the degree of B.A. with Honours in Natural Sciences from Cambridge, after which he went to St. Bartholomew's Hospital Medical School to pursue his clinical studies.

At the outbreak of the war he entered the War Office laboratories, and on qualifying as a medical practitioner in 1916 joined the Royal Army Medical Corps, and was detailed for duty in Mesopotamia. Being invalided home in 1917, he joined the staff of the War Office Vaccine Department, and for his good work in this position he received the O.B.E. At the close of the war he was appointed Senior Demonstrator in Pathol-

ogy at Bart's. and in 1920 went to the National Research Council to carry on research in Bacteriology. In 1926 he joined the Department of Pathology in Cambridge University, where he was appointed a Fellow of Christ's College and University Lecturer in Pathology. At Cambridge, under Professor Dean, he distinguished himself as a teacher, lecturer and organizer, and has published research work of distinction. He will be a notable addition to the staff at McGill.

It has been announced that, through the generosity of T. B. Macaulay, Esq., and members of the Board of the Sun Life Assurance Co. of Canada, Dr. L. J. Rhea, Chief Pathologist of the Montreal General Hospital, will proceed to London, England, to study methods in use there of preparing material for use in the disease known as insular scelerosis. Discovery of an agent for the treatment of this disease was announced some time ago from the laboratories of Sir James Purves Stewart, and Dr. Rhea's studies will, it is confidently expected, mean that the highly scientific methods at present in use in London will be available, in due course, in Montreal.

In mid-November the Governors of the Royal Victoria Hospital accepted with deep regret the resignation, as Chief of the Department of Oto-Laryngology, of Dr. H. S. Birkett, C.B., M.D., C.M., LL.D., former Dean of the Faculty of Medicine of McGill University, and original Commanding Officer of the University's famous overseas medical unit, No. 3 Canadian General Hospital, (McGill), B.E.F. Simultaneously, it was announced that Dr. Birkett would be succeeded as Chief Oto-Laryngologist of the Royal Victoria Hospital by Dr. E. Hamilton White, who, for many years has served on the staff and, since 1920, has held the post of Assistant Oto-Laryngologist. Dr. White is a member of the Royal Society of Medicine, London, England, a Fellow of the American College of Surgeons, and a member of the American Academy of Ophthalmology and Oto-Laryngology.

Dr. F. C. Harrison, Dean of the Faculty of Graduate Studies and Professor of Bacteriology, who has resigned these posts, has been appointed Emeritus Professor of Bacteriology.

Other resignations announced are those of Dr. J. W. Bridges, Professor of Abnormal Psychology.

Mrs. J. W. Bridges, Assistant Professor of Abnormal Psychology.

Dr. N. B. Dreyer, Assistant Professor of Pharmacology. Dr. Dreyer has gone to Dalhousie University as Professor of Pharmacology.

Oxford University

On June 25th, the honorary degree of D.Sc. was conferred on Sir Arthur Keith, F.R.S.

The Board of Awarders has awarded the Osler Memorial Medal for 1930 to Sir Wilmot Herringham. It is given every fifth year to the Oxford medical graduate who has, in the opinion of the Board of Awarders, made the most valuable contribution to the science, art, or literature of medicine, and who has not previously received the medal.

Queen's University

At the Convocation on October 24th, the portrait of Dr. J. C. Connell, formerly Dean of the Medical Faculty and latterly Acting Principal of the University, was presented to the University. The portrait is the work of Mr. K. E. Forbes, of Toronto, and represents a grateful acknowledgement by the graduates of the last twenty-five years of Dr. Connell's devoted services to the Medical School. The presentation was made by Dr. Edward Ryan, and the portrait was accepted on behalf of the University by Principal Fyfe.

Dr. Ryan himself has recently resigned from the Chair of Psychiatry. For more than thirty years he had been a valued member of the teaching staff in the Departments of Anatomy, Medicine and Surgery, and eventually in the Department of Psychiatry while Superintendent of the Ontario Hospital, Kingston. In 1927, Dr. Ryan was appointed Director of Medical Services by the Provincial Government, and has recently retired from that office and from his hospital appointment.

Dr. T. D. Cumberland, who has succeeded Dr. Ryan as Superintendent of the Ontario Hospital, Kingston, has been appointed Professor of Psychiatry in the University.

Dr. Boris Babkin, of McGill University, delivered a Post-Graduate lecture on November 21st, dealing with "Hormone Control of Gastric Secretion."

Dr. W. Alfred Jones has recently been appointed Professor of Radiology at Queen's University, Kingston.

University of Toronto

Dr. James Crawford Watt, formerly Associate Professor of Anatomy in the University of Toronto, has been promoted and given the full rank of Professor of Anatomy.

University of Western Ontario

Dr. Earl Watson, of London, Ont., is the first and only graduate to receive the coveted degree of F.R.C.P. (Edin.) Dr. Watson after graduation spent some time in the department of pathology and bacteriology at the Institute of Public Health, going from there to the University of Sheffield as an assistant to Professor Leathes

in the department of physiology. Since returning to London he has had charge of the clinical laboratory at Victoria Hospital and has been appointed Associate Professor of Pathological Chemistry and Assistant Professor of Clinical Medicine.

Eight fewer students are registered at the Medical School for this session as compared with last year. In the graduating class there are 38 students, in the fifth year 33, in the fourth year 36, and in the third year 33, making a total of 140.

Special Correspondence

The London Letter

(From our own correspondent)

In the corresponding letter of just a year ago mention was made of the chief events of 1929 in the medical world and in the first place was put the formation of the National Radium Trust and Radium Commission. Now, after approximately twelve months' work, the Commission has issued its first report. Naturally, the question of the exact value of radium in treating cancer could not possibly be settled in so short a time, and indeed it almost seems as if each new authority dealing with radium therapy adopts a more guarded attitude. The main work of the Commission during the past year has been concerned with the purchase of sufficient quantity of radium and its allocation to certain "national radium centres". London has been treated as a special and separate case, while twelve centres have been created outside the capital. By the end of August some 18 grams of radium had been provisionally allocated to national centres, but the situation to-day is that there is more radium in the country than there are people capable of using it. In far too many cases a visit of a fortnight to some continental centre has been considered adequate by some surgeons and radiologists to learn all the latest features of radium technique, but it is hoped that this very serious fault may shortly be corrected by the newly-founded "National Post-Graduate School of Radiotherapy". As has already been mentioned in these notes this post-graduate school has come into being by utilizing the Mount Vernon Hospital (previously used for tuberculosis) together with the existing Radium Institute in London. A comprehensive course of instruction has already been approved and advertised so that the training of an adequate force of radium workers equipped with the highest standard of technique is merely a question of time. The Commission has done valuable work already in getting the wheels in motion and in putting radium treatment in its proper position before the public.

In view of the many criticisms that have been levelled at the panel doctor during the last few months, and also because of the recent proposals for an extension of the existing insurance medical service it is of interest to obtain some facts from the annual report of the chief medical officer of the Ministry of Health about the panel system in this country. The number of insurance practitioners in England and Wales in 1929 was 15,573 and the average number of patient on each practitioner's list was 932, so that out of the total population 14 million persons are insured. Nearly half the men doctors and one-third of the women doctors in this country are engaged in insurance practice and this should be borne in mind by critics of the system who seldom realize what a large proportion of the profession they are attacking. According to Sir George Newman, the efficiency of the service is maintained by three factors: the natural tendency of the doctor to do his best for his patient; free choice of doctor; and the right to lodge complaints with insurance committees. During 1929 a total of 174 complaints were investigated and disciplinary action was taken in 30 cases with the drastic step of removing a practitioner from the panel list in only one instance. With regard to increased sickness claims there do appear some grounds for thinking that doctors ought to "sign patients off the panel", that is to give a final certificate, sooner than is sometimes done. Against this must be placed the preventive work carried out by the panel doctor by virtue of the insurance system, which could not be otherwise done, because sick individuals would not come to consult in the earliest stages of their trouble. Taken all round, and despite what is said by critics of the system in this country and elsewhere, the annual expenditure of between eight and nine million pounds is recognized by the state authorities as well spent.

It was considered a great advance when in 1923 the Middlesex Hospital set aside two small wards for the treatment of functional nervous disorders. The results of this forward step have been remarkably good, patients being willing to come to a general hospital with their early symptoms when they would never go near the out-patient department of "hospital for mental disorders", however much the terms "asylum" or "lunatic" might be hidden or disguised.

The Governors of St. Luke's Hospital, who cooperated with Middlesex Hospital in the 1923 scheme, have now gone a stage further and last month saw the opening of "Woodside Nerve Hospital" which they have built and equipped. Here is accommodation for 50 patients and the rational treatment of functional nervous disorders by all modern methods will be carried out while an out-patient department will serve the same purpose as a similar department at the Middlesex Hospital. The new institution in one of the suburbs supplies a definite want in London and its development will be watched with interest.

ALAN MONCRIEFF

London.

The Edinburgh Letter

(From our own correspondent)

The Managers of the Royal Infirmary, Edinburgh, have issued their bicentenary extension appeal for £500,000. The Infirmary's story of two centuries devoted to the healing art is a striking record of continuous development and increased expansion, from the inception of the small and unpretentious hospital in Robertson's Close with its 6 beds, to the present institution treating in its 1,000 beds 20,000 patients annually. The immediate requirements of the Royal Infirmary calling for support are: the reduction of the waiting list, the provision of a combined obstetrical and gynæcological hospital, and the erection of a new home for nurses. The Directors of the Royal Maternity and Simpson Memorial Hospital have for some time contemplated the building of a large, modern, and fully equipped maternity hospital. It has been decided that this institution should amalgamate with the Royal Infirmary. The Managers of the Infirmary propose to erect a new obstetrical and gynæcological hospital of 240 beds, complete with ante-natal and out-patient departments. The completion of this new hospital will liberate certain beds in the Infirmary which are at present utilized for gynæcological cases. The extra accommodation thus provided will permit the treatment of an additional 2,000 patients annually. This will to a large extent solve the problem of the waiting list. With the continued expansion of the Infirmary more adequate accommodation is required for the nursing staff. A new home capable of making provision for 300 to 400 nurses forms part of the scheme of extension.

On October 25th Sir James Barrie, O.M., the author of Peter Pan, was inducted into the high office of Chancellor of the University of Edinburgh. The ceremony took place in the M'Ewen Hall of the University, when the following honorary degrees of Doctor of Laws were conferred: Sir Thomas Henry Holland, K.C.S.I., K.C.I.E., F.R.S., Principal and Vice-Chancellor of the University; Harley Granville-Barker, F.R.S.L., playwright; Neil Munro, author and journalist; Sir Arthur Thomas Quiller-Couch, M.A., Litt.D., F.R.S.L., King Edward VII Professor of English Literature, University of Cambridge; Sir Joseph John Thomson, O.M., P.R.S., D.Sc., Master of Trinity College, Cambridge.

The trustees of the late Mr. Edward Clark, printer in Edinburgh, have intimated to the University Court their decision to grant to the University the sum of £15,000, as an endowment for the foundation of a Chair in the subject of Child Life and Health. This new professorship will be for teaching, research and generally facilitating study in connection with the various aspects of child life, including conditions affecting the development and upbringing of children and the prevention and treatment of disease.

Dr. G. Lovell Gulland, the Emeritus Professor of Medicine, delivered the inaugural address, at the opening of the 194th session of the Royal Medical Society. He was president of the Society in 1886. Dr. Gulland chose as his subject "Retrospect and Prospect". In his address he recalled many incidents and made numerous interesting comparisons between the teaching of Medicine now and in the days when he occupied the chair forty-four years ago.

During the past academic session the post-graduate courses in connection with the University were well attended. It is particularly gratifying to observe that doctors from Canada, Australasia, and the United States are finding in Edinburgh work which meets with their requirements. In addition to the usual vacation course held during August and September, a short course of medical clinics was held for four weeks during the month of May. Many of those attending this course were men who had come to Edinburgh for the purpose of taking one of the higher degrees. A special course in Ophthalmoscopy was held at the same time as the medical clinics. Surgery was taught to graduates each academic term, and a vacation course was held at the same time as the one in medicine. These courses include lectures in Radiology and are attended by graduates from all over the world, many of whom ultimately sit for the F.R.C.S. examination. Special classes are available in Surgical Pathology, Venereal Diseases, Ear, Nose and Throat, Obstetrics, Gynæcology and Diseases of Children. In addition during the past year classes were held in Tuberculosis, Modern Methods of Diagnosis, Pathology of the Nervous System, Electrotherapeutics, Vaccine therapy and Diseases of the Blood. The course

in Surgical Pathology continues to grow in popularity and each year sees an increase in the number attending. In connection with the Post-Graduate School a series of special lectures were given during the months of August and September. This included addresses by Sir Norman Walker, President of the Royal College of Physicians, Sir Leslie Mackenzie, Dr. Parlane Kinloch, Principal Medical Officer of the Department of Health for Scotland, Dr. Chalmers Watson on "Modern Developments in Nutrition", Professor F. A. E. Crew on Sex-Endocrinology, and Dr. R. A. Fleming on "Some Medical Aspects of Prisons and Prisoners".

Some months ago the University Court appointed Col. Ranald B. Campbell, C.B.E., Director for the Promotion of Physical Welfare of Students. In connection with this scheme, which is under the personal supervision of Col. Campbell, every student, both male and female, is enabled to get expert advice as to the form of athletics most suited to his requirements. In addition to all forms of out-door sports, a well-equipped gymnasium has been acquired with fully qualified instructors, and classes are run daily at times to suit the convenience of those attending. Arrangements have also been made to make medical examinations available for those who desire it. For this purpose two medical advisors have been appointed, one for the men and one for the women. Complete records are being kept of all those examined, and each student is graded in much the same way as was done during the war. The information thus gained should in time prove most useful from the statistical point of view, and moreover it is hoped to encourage those not graded in the first class to take steps to improve their physical condition.

GEORGE GIBSON

23 Cluny Terrace, Edinburgh

Letters to the Editor

Infection of Surgical Wounds with Diphtheria Bacilli

To the Editor:

I have read with interest the article on "Infection of Surgical Wounds with Diphtheria Bacilli" by F. H. Prissick, which appeared in the December issue of the *Journal*. The author refers to outbreaks of diphtheritic wound infections which were reported during and after the war. He deals at very considerable length with a series of investigations carried out by a group of investigators at Folkestone, Orpington, and Taplow. Upon the basis of those observations Prissick concludes that "wound diphtheria is rare. The possibility of its occurrence should be borne in mind and when it is even suspected a thorough bacteriological examination should be made." He also points out that "a positive *B. diphtheriæ* infection of wounds cannot be made with certainty from a direct smear;" and, "the virulence of a strain of *B. diphtheriæ* isolated from infected surgical wounds can only be determined by a virulence test." With the two latter conclusions I am in complete agreement.

Prissick, however, omits reference to other important communications upon the subject made a little later by Janes and Thomas (A Further Report upon Diphtheroid Infection of Wounds, *Can. Med. Assoc. J.*, vol. ix, p. 434, 1919) and the report by Douglas, Fleming and Colbrook (*Med. Res. Counc. Spec. Rep.* series No. 57, p.61, 1920) in which it was thoroughly established that diphtheritic wound infections were more prevalent than had previously been believed. Both Douglas and his collaborators, and Janes and Thomas, identified the strains of *B. diphtheriæ* isolated by them by means of fermentation reactions and virulence tests. The original investigations reported by D. E. Robertson and the present writer (*J. of the Amer. Med. Assoc.*, vol. lxix, pp. 791-793, Sept. 8, 1917) led to a thorough examination of suppurating wounds observed in members of the Canadian Expeditionary Force. That served the purpose which the writers had in mind. In addition, however, the recommendation made by us that "The routine swabbing of long-continued suppurating wounds should be undertaken" led to administrative action which resulted in its adoption in a great many military hospitals in England and in Canada.

That true diphtheritic wound infections are as rare as Prissick's article might lead one to believe is not supported by observations of Levy (*Amer. J. of Surgery*, vol. xxxi, p. 193, Aug. 1917), nor those of Hartsell and Morris (*J. of the Amer. Med. Assoc.*, vol. lxxxii, p. 1351, 1919). A statement which we made in the second communication upon this subject ("Diphtheritic Wound Infections," J. G. FitzGerald and D. E. Robertson, *J. of the Amer. Med. Assoc.*, vol. 73, pp. 131 and 132, July 12, 1919) may here be reiterated "We would again recommend, therefore, that both in civil and military hospitals a careful bacteriological examination be made of all suppurating open wounds. We have pointed out (Janes and Thomas; also Hartsell and Morris have expressed similar opinions) that clinically the diagnosis between diphtheroid or other aerobic and true diphtheritic wound fections cannot be made. It is necessary, if the diagnosis

of wound diphtheria is to be definitely established, that a careful bacteriological examination be undertaken which will include virulence tests and protection experiments." In our last publication (Diphtheric Wound Infections, J. G. FitzGerald and D. E. Robertson, *Pub. Health J.*, vol. x, No. 8, p. 360, Aug. 1919) this conclusion was set out "While an enormous amount of military laboratory work was occasioned by the publication of our first report, still we feel that any measures which are designed to lessen the convalescent period of wounded Canadian soldiers and facilitate their civil re-establishment were more than justified, and such was the motive that prompted the publication of our first communication."

May I congratulate the writer of the paper in the December issue of the *Journal* above referred to in again directing attention to the subject of skin diphtheria?

J. G. FITZGERALD, M.D.
School of Hygiene and Connaught
Laboratories, University of Toronto.
Dec. 15, 1930.

Topics of Current Interest

Vaccination with BCG

Now that the congresses of Paris, Oslo, and London are over it may be worth while to review briefly some of the more important observations made on the BCG strain, which came up for discussion both in and out of session. In doing so we shall omit all reference to the Lübeck disaster, the official inquiry into which is still proceeding. The facts at present available are confused and somewhat contradictory, and we do not wish, by putting forward premature explanations, to prejudice the issue in any way.

In the absence of reliable statistical data on the effect of BCG vaccination of human beings, many workers have devoted their attention to a more careful study of the strain itself. It will be remembered that Petroff succeeded in demonstrating in the BCG strain two different types of colony; one, which he called the R type, was avirulent on subcutaneous injection into guinea-pigs, while the other, which he called the S type, and which was present in far smaller numbers, was stated to be capable of giving rise to generalized tuberculosis. Careful study of Petroff's protocols renders it doubtful how far his conclusions on the virulence of the S type are justifiable. After subcutaneous inoculation of guinea-pigs with about 1 to 3 mg. (moist weight) of bacilli death was not invariable, nor were the lesions at necropsy always severe and extensive. As for rabbits, intravenous inoculation of even large doses, 15 to 30 mg., was often borne quite well, and in the few rabbits that did succumb, the lesions were confined to the lungs and kidneys. As is well known, very similar results may be obtained by the use of dead bacilli, which, though naturally unable to set up infection, are nevertheless capable of giving rise to tubercle formation. It seems quite clear that the virulence of the S type was definitely below that of a standard bovine strain. The employment by Petroff of relatively large doses may explain why some workers, notably Gerlach, have failed to confirm his findings on the virulence of the S type, even when using his own cultures.

If these results stood alone, it would be unwise to lay too much stress upon them. But during the last two years several workers have either confirmed certain of Petroff's results, or have brought corroborative evidence to indicate that his main contention regarding the essential heterogeneity of bacillary type in the BCG strain is correct. Not only has the existence of two colonial forms been demonstrated in numerous laboratories, but the conversion of the practically avirulent whole culture into a highly virulent culture has been accomplished both by passage through guinea-pigs and by certain *in vitro* procedures. These results, most of which are still unpublished, leave no doubt that the virulence of the BCG strain is capable under suitable conditions of being exalted. They are all the more convincing because of the close agreement which they present with observations made of late years on other microörganisms, such as the pneumococcus, the streptococcus, the fowl-cholera bacillus, and *B. œrtrycke*. Generally speaking, when a strain of one of these organisms, as the result of repeated subculture in the laboratory, loses its virulence, it is found that the initial, virulent, smooth bacteria have been replaced by avirulent rough bacteria. During the actual process of transformation, the evidence suggests that the rough organisms make their appearance and gradually increase till they eventually replace the smooth organisms more or less completely. So long as a certain proportion of the smooth type remains, the whole culture may prove virulent, but once this proportion has dropped below a certain level, its virulence falls. Provided the replacement has not gone too far, it is often possible by suitable means, such as animal passage, to restore the full virulence to a culture that has become almost avirulent. This restoration seems to depend on an increase in the proportion of the smooth to the rough organisms in the culture.

The analogy which the BCG strain presents with attenuated strains of such other organisms as have been mentioned is a very striking one. There is general agreement that this strain, though highly attenuated, is not completely devoid of virulence. Petroff's demonstration that it contains two types of bacilli, one avirulent and the other possessed of at least a certain degree of virulence, together with the findings of Watson and others that its virulence can be restored by animal passage, affords sufficient proof of the incorrectness of Calmette's contention that its virulence is fixedly and permanently attenuated. If this conclusion is accepted, it follows that the administration of this vaccine to human beings is fraught with some degree of hazard. It is true that BCG has so far been used to vaccinate something like 400,000 infants without any apparent deleterious effect, but the fact remains that the danger of its reversion to a more virulent type, particularly under altered conditions of cultivation, cannot be regarded as insignificant. Its use in practice is therefore a question of expediency. In the face of such a widespread disease as tuberculosis many authorities consider it justifiable to incur the necessary risk, judging this to be very much less than that of active tuberculosis. On the other hand, several workers are so impressed with the dangers inherent in the use of living vaccines that they prefer not to use the BCG strain at all.

The case for the supporters of BCG vaccination would be very much stronger if only animal tests had given unequivocal results, but unfortunately these have so far been disappointing. The experiments carried out by Watson in Ontario, Rankin in Alberta, Larson and Evans in Illinois, Schroeder and Crawford in Maryland, and Haring, Traum, Hayes, and Henry in California, involving the use of over three hundred cattle, indicate that vaccination with the BCG strain cannot render the animals fully resistant to infection, either when they are submitted to artificial inoculation or exposed to natural sources of contamination. There is evidence that the development of tubercle bacilli within the body may be retarded for some time, but even with revaccination this increased resistance proves but transient, and the disease in the vaccinated animals develops ultimately in very much the same way as in the controls. In Europe the vaccine has been used for cattle chiefly under field conditions, and the difficulty of obtaining exact numerical results is nearly as great as with human beings. Ascoli, in Northern Italy, maintains that it has brought about a very marked decrease in mortality, but this is not altogether supported by the figures he supplies. In any case, since the vaccine has been used for only about four years, it is too early to judge its prophylactic value; the incidence of tuberculosis in calves, heifers, and young cows is very low, and it will be necessary to wait for at least another five years before its preventive action can be at all accurately assessed. Until further and more extensive experiments have been carried out on animals, and until these have been attended by uniformly favourable results, it will appear to many that the conservative attitude so far adopted by the medical and veterinary professions in this country towards vaccination with BCG has been not altogether unjustified.—*Brit. M. J.*, 1930, **2**: 694.

Statistics of BCG

In a communication made to the Académie de Médecine on November 4th, Prof. Calmette brought the statistics of BCG up to date with certain figures of exceptional interest. At the present time every seventh infant born in France is vaccinated with BCG—*i.e.*, 8,000 to 9,000 infants every month. The total number of persons thus vaccinated in France up to October 1, 1930, is 280,000, and this figure does not include 112,000 infants vaccinated in the French colonies and protectorates. About an equal number have been thus vaccinated outside French territory, and every European country, with the exception of Austria, Great Britain, and Portugal, has introduced BCG vaccination. The countries in which it has been most extensively adopted and yielded instructive results are Greece, Poland, Roumania, Spain, and Sweden. In Roumania more than 60,000 infants have been vaccinated. In Sweden, in the province of Bothnia, where there is much tuberculosis, 4,009 infants were vaccinated between September, 1927, and May 1, 1930. In the same place and period, it is stated, there were 8,342 infants who lived under the same conditions and who, not being vaccinated, served as controls. During these three years, the mortality for the non-vaccinated was 22.2 per cent, whereas that for the vaccinated was only 6.6 per cent. Prof. Calmette presented a table of statistics gleaned from Germany, Belgium, Bulgaria, Spain, Greece, Hungary, Poland, Roumania, Russia, Sweden, Czecho-Slovakia, Jugoslavia, the Argentine, Brazil, Canada, United States of America, Mauritius, and Uruguay. As he pointed out, a comparison of the tuberculosis death-rates among vaccinated and non-vaccinated infants is apt to be misleading, because it is exceptional for the cause of death to be determined by a doctor, whereas if a comparison is made of the general death-rates in the two groups, every death from tuberculosis is counted in one or other of the two groups. Another interesting comparison was that made between two different age-groups—the first month of life and the last eleven months of the first year of life. BCG vaccination not having had time to be effective

during the first month of life, no difference could yet be expected in the death-rates in the vaccinated and non-vaccinated groups. But there should be a difference in the second age-period in favour of the vaccinated if BCG possesses the merits claimed for it. The correctness of this hypothesis, said Prof. Calmette, has already been proved in Bulgaria, where the death-rates in the first month of life have been approximately the same for the vaccinated and non-vaccinated, whereas in the second age-period, from one to twelve months, the death-rate was 11.4 per cent for the non-vaccinated and 5.6 per cent for the vaccinated. In France, in the Department of Guebwiller (Upper Rhine) there were 478 births in 1925; none of the infants born in this year were vaccinated. Every one of the 445 infants born in 1928 was vaccinated with BCG. The death-rate during the first month of life among the infants born in 1925 was 2.7 per cent; for the infants born in 1928 it was 2.76 per cent. But in the age-period from one month to a year, the 1925 death-rate only 1.37 per cent. Though it might be argued that the mothers who got their infants vaccinated would also in other respects care better for them than the mothers who did not get their infants vaccinated, this possible source of error can be eliminated in the case of the dispensary infants. These (constituting the majority) were under the supervision of visiting nurses who would devote equal care to the vaccinated and the non-vaccinated.—*The Lancet*, 1930, **2**: 1203.

Maternal Mortality in England and Wales

During 1929 there were 643,673 births registered in England and Wales. The number of deaths classified as due to pregnancy and child-bearing was 2,787, and in addition there were 960 deaths of women not so classified, but returned as associated therewith. The total puerperal mortality (4.33 per thousand births registered) was only slightly below the figure for 1928 (4.42), which was the highest recorded since the classification came into use in 1911. The death rate from puerperal sepsis alone, apart from other puerperal causes, was 1.80, the highest recorded, except in 1920, when it was 1.81. "It is disappointing," says Sir George Newman, "to be unable to report any definite tendency towards reduction, especially as all investigation indicates that these figures might and should be substantially reduced."

An analysis of the figures in relation to locality shows that the northern districts of England have the highest maternal mortality rate. In London the rate is lower than in any other part of the country, a favourable position due in part to the number of maternity hospitals and medical and midwifery schools, but also in part to the smaller proportion of abnormal confinements. Rickets is less familiar in London than in districts of Lancashire and Yorkshire, and therefore there is less risk of pelvic deformity leading to difficult labour; also possibly some forms of toxæmia, causing eclampsia and hæmorrhage, are more prevalent in northern industrial districts. The Midlands and South have almost invariably a lower maternal mortality than the North, though a Midland county, Huntingdonshire, has the highest maternal mortality in England, and Radnorshire the same unfortunate preëminence in Wales. Puerperal sepsis, as the report points out, is a disease of urban rather than rural life, but the other causes of maternal deaths, such as difficult labour, eclampsia, and hæmorrhage, are such as call for prompt and skilled medical aid, which is more readily available in the large towns.

In writing of the interim report by the Departmental Committee on Maternal Mortality and Morbidity, Sir George Newman, who was its chairman, points out that in only 5 per cent of the deaths investigated by the committee was there an absence of reasonable facilities for effective medical care, but in 43 per cent there was an absence of ante-natal care, or errors of judgment by doctor or midwife, or negligence of the patient. "There is, and can be, no allocation of blame or culpability, for all the circumstances and conditions are not known, but there is the clearest possible indication of the exact direction and focus of the necessary remedies . . . They imply amendment in the medical care of the individual mother." Three practical considerations emerge from the report of that committee and of the other departmental committee, on the training and employment of midwives. "First, there is an absolute need for effective ante-natal supervision of every case of pregnancy; secondly, there is a relative need for improved obstetric practice—on the part of doctors and midwives — ante-natal, at childbirth, and post-natal; and lastly, there is a relative need for the fuller completion of local organization to provide, and make available all the necessary facilities for an effective service." —*Brit. M. J.*, 1930, **2**: 792.

Medicine and the State

The Public Health Congress was opened at the Agricultural Hall on Monday last by the Minister of Health. At this time, when schemes of State and universal medical service are being discussed on all sides, it is natural that the first subject prescribed for discussion should have been "Medicine and the State." Sir Arthur Newsholme, in a paper read at the

opening session, laid down as governing principles the following nine postulates: "Every member of the community should have, so far as essentials are concerned, equal provision for the treatment of illness. Complete medical service must be available gratuitously for all who cannot pay. The patient's welfare forms the primary and predominant consideration in all planning for a 'general medical service.' A consultant service and all necessary specialist and ancillary forms of diagnosis and treatment should be available for the individual patient, normally through the agency of the family doctor. Treatment should be educative. The causes and conditions leading to illness should be sought out and, to the full extent practicable, preventive advice should be given and preventive action taken. Neither medical practitioner nor medical officer of health should allow his attention to be monopolised by treatment, thus diverting study and action from preventive measures. The individual doctor can only fulfill the immense possibilities of good implied in his relationship to his patient when he is imbued with a living appreciation of the profoundly ethical importance of his work and his teaching. For medical treatment the family, not the patient, should be the unit. It is in the interest of the family, ceteris paribus, that one doctor should be able to examine and advise every member of the family. It is dishonest to assume and continue responsibility for the treatment of a patient unless one has sought to obtain accurate knowledge, determined by detailed examination of his physiological systems, of the patient's fundamental conditions of health."

In commenting on these points Sir Arthur Newsholme acknowledged the debt owed by the public health service to lay experts and to the devoted work in the past of private charity, in general practice, in poor-law provision, and in hospital work. Mentioning the "abuse" of the hospital by the panel patient, he took occasion to upbraid the abuse of the patient by the hospital—the waste of time and perfunctory work involved in the present system of seeing patients without appointment. The public health authorities, he said, would be happy to hand to the family doctor their work for infants, children, and the tuberculous as soon as the country developed a general practitioner system which would ensure the regular and reliable overhaul of every child and patient. The excessive expenditure on social services could not be met by stopping any medical service; it could be met by coordination and curb on overlapping and extravagance. Often *ad hoc* buildings and staffs were provided for each service, where a single health centre would be more efficient as well as more economical. The day of single-handed medical practice is past, Sir Arthur declared, but expert assistance must only be available in collaboration with the ordinary medical attendant, who must learn to be a medical officer of health in the range of his own practice, and must not lose his essential position as family adviser. The increase in specialized knowledge which makes it so hard for one man to be an adequate medical adviser could be largely met by grouping practitioners in an area, so that the opinion of each or all was available for any patient. In conclusion, Sir Arthur touched on the vexed problems of over-prescribing and certification, suggesting as remedies that the doctor should resolve never to give a prescription that he would not give to his own family, or that was only a placebo to cover inadequate understanding of the patient's condition; that the patient should pay a part of the cost of drugs; and that the sickness insurance societies should be regionalized and placed in some respect under county and county borough administration so that excessive sickness could be analyzed and investigated. —*The Lancet*, 1930, **2**: 1135.

The Value of Mercurochrome

The value of mercurochrome as a therapeutic agent formed the subject of a discussion at a meeting of the Section of Therapeutics of the Royal Society of Medicine on October 11th, under the presidency of Dr. Philip Hamill. Apparently one of the chief difficulties experienced by those who wish to estimate its effect lies in the difficulty of obtaining a commercial product of standard composition. Dr. J. H. Burn, who has recently tested the toxicity of eight different samples of mercurochrome by injection into mice, was able to produce figures showing a wide range of variation from the theoretical product. At least five of these eight samples were prepared by different firms; analysis showed that while, theoretically, mercurochrome should contain 26.7 per cent of mercury, 21.3 per cent of bromine, and no acetate, one product out of the eight contained as much as 40.9 per cent of mercury, only 11.4 per cent of bromine, and 7.5 per cent of acetate, and the remainder contained proportions of these substances which showed wide deviations from the theoretical values. By injecting different quantities of each sample into large numbers of mice he was able to estimate the average lethal dose of each product—that is to say, the number of milligrammes per kilogramme of body weight which would suffice to kill 50 per cent of the mice injected. He found that the least toxic sample contained the amount of mercury which approximated most nearly to the theoretical

value, but that the toxicity of any sample by no means ran parallel to the proportion of mercury. He pointed out that it was impossible to assess the value of mercurochrome until the medical profession had insisted on the production of a standardized preparation by the manufacturers. Sir William Willcox felt that this was an argument for relegating the use of mercurochrome to a time when there was no danger in its use, either to the healthy person or to the patient in dire extremity; but the majority of speakers, if not enthusiastic, were able to award it the tribute of the old Scottish woman to her doctor, and to say that at least it did no harm. Mr. K. Heritage, however, had found it to be of value given intravenously in cases of appendix abscess which ran a swinging temperature after operation. Usually the temperature settled after the first injection, and later rose again, but two or three doses sufficed to bring about complete lysis. It was also effective, if used to wash out the bladder, in cases of intractable chronic cystitis, especially in women, but as a wash for the renal pelvis in pyelitis it had given disappointing results. Some good effects had been observed by Mr. L. C. Rivett from the use of local applications of mercurochrome in chronic cervicitis, but as an intravenous injection for puerperal sepsis he had found it to be disappointing, especially where the infecting organism was a hæmolytic streptococcus; in the presence of a *B. coli* infection there was a greater chance of benefit to the patient from its use. No other outstanding examples of the value of mercurochrome were quoted, and apart from chronic cervicitis, appendicitis with abscess, and cystitis, the feeling of the meeting was apathetic rather than laudatory.—*The Lancet,* 1930. **2**: 1088.

Training in Medical Radiology

A special feature of the Second International Congress of Radiology in Stockholm two years ago was a meeting held to discuss teaching and training in medical radiology. Twenty-three papers on this subject were submitted from as many countries, and these have now been brought together, with interpolated comments, into one volume.* Most of the papers are printed in German, the rest in English or French. Dr. Stanley Melville is responsible for the British section, and his communication deals largely with the teaching for the diplomas in medical electricity and radiology granted by the Universities of Cambridge, Liverpool, and Edinburgh. A point of interest which emerges from these papers is that whilst Great Britain at the time of the congress had no chair of radiology, the United States had twenty-five full professors and nineteen associate or assistant professors, and every other country represented had its professor of this subject. On the other hand, Britain gives three university diplomas, and is apparently the only country to do this. Since the Stockholm congress the University of London has established a Chair of radiology, and has appointed Professor Woodburn Morison the first professor. There is a good deal of very useful information to be found in many of these papers on the organization of tuition in radiology.—*Brit. M. J.*, 1930, **2**: 790.

* Home Office: Form 1893. H.M. Stationery Office. Price 2d. net, or 3s. net for 25.

Death-Bearing Fish

The perils of bathing are not confined to shark-infested waters, and Mr. David Greig's brief paper on thanatophoric fish gives further support to those who distrust the sea and all its works. The larger weever, the smaller weever, and, according to some, the sand-weever, are to be found, he tells us, in British waters, and like the flounder prefer to bury themselves in the wet sands of the shallows. It appears, however, that injuries are rarely received through the bare skin of the foot, but usually fall to the lot of those who handle these fishes in unwary curiosity. The armature of the weever consists of five or six grooved spines upon the anterior dorsal fin, enclosed in connective tissue and sharply pointed. Glands are present in the grooves which secrete a transparent, acid fluid containing an alkaloid which has a selective action on nervous tissue. When the spine is driven into the flesh the integument yields to pressure and is thrust back towards the base, while the poison flows down the groove into the wound. Distressing symptoms supervene within a few minutes, beginning with acute pain and itching at the site of inoculation; as the pain spreads up the limb it becomes unbearably intense, there is respiratory embarrassment and sweating, noises in the ears, impairment of hearing, flashes of light before the eyes, intermittent pulse, and finally, delirium, which may end in convulsions and death. Even if recovery takes place after many hours of pain, improvement is slow and malaise may persist for months. Mr. Grieg thinks a case recorded last year by Schulman and Ravier in *Progrès Médical* was doubtful as an example of poisoning by thanatophoric fish. The symptoms described by these observers included retention of urine and paresis of the legs, which progressed into an ascending paralysis and led to death from asphyxia. In spite of his vivid description of the symptoms usually observed, Mr. Grieg

offers no suggestions for the first-aid or subsequent treatment of the patient, whom he abandons in convulsions on the beach. Various empirical remedies, including potassium permanganate, were detailed in a paper on Fishermen's Diseases by Dr. H. Muir Evans, of Lowestoft, reported in *The Lancet*, 1921, **1**: 517. —*Lancet*, 1930, **2**: 1166.

Medico-Legal

Arsenic in Candy

Our London Letter for November last contained a reference to a number of cases of poisoning at Stoke-on-Trent, due to eating candy that had been powdered with white arsenic. Fortunately, none of the cases resulted fatally. It will be of interest to hear of the aftermath.

"Remarkable evidence was given at Stoke-on-Trent during criminal proceedings against two men, respectively described as a sugar boiler and a sweet manufacturer. The actual charge upon which they were convicted was that of powdering sweets with arsenic. According to the prosecution the Food and Health Department of the Stoke City Council became aware early in September of an outbreak of illness due to the eating of sweets. The sweets were found to be heavily impregnated with arsenic. On September 8th every bottle of sweets made by this particular manufacturer was seized and sealed to prevent further distribution. The sugar boiler had premises in Tunstall, where a box was found containing nearly a hundredweight of arsenic. He said he honestly believed it was French chalk. The sweet manufacturer had said he was short of dusting powder and so powder from the box was furnished. It appeared that in the yard near the sugar boiler's premises there were works where enamelling was done. Mr. A. E. Johnson, the city analyst, said the first sweets he analyzed contained grs. 77 of arsenic per pound; another sample of cough sweets contained grs. 82. The maximum permissible was gr. 1/100th. Of two samples of dusting powder, one contained 95 per cent of arsenic, the other consisted entirely of arsenious oxides. Fortunately, no deaths resulted; the poison being in such large doses, the consequent vomiting seems to have eliminated it before it was absorbed. The magistrate, in fining the accused £25 and £15 respectively, said that the sugar boiler had not taken the slightest trouble to find out if the powder was fit for the purpose. Even if the man thought it was a proper powder previously used in his own business, it was grossly careless to use it without some precaution to see whether it had been tampered with. There was no substantial ground for thinking it to be French chalk. As for the sweet manufacturer, if a person, without the slightest precaution, used material which was injurious to health, and intended that, when the operation was completed, the article should be sold, that was an offence.

Had a civil action been brought against the two defendants for damages, they could hardly have avoided an adverse judgment. There was a strong prima facie case of negligence; in the legal phrase *res ipsa loquitur*. Had death resulted been followed by criminal proceedings for manslaughter, it would, of course, have been necessary to prove a higher degree of negligence than in a civil action. One may expect that some of our enterprising municipalities will now seek powers by Local Act to keep their medical officers in close touch with the premises where sweets are manufactured. The present powers of inspection are inadequate if the local authority does not know what premises are being thus used. The provisions in many Local Acts for the registration of manufacturers and premises used for the purposes of ice-cream, potted and preserved meat, food made from fish, etc., could, perhaps, be extended.

The incident at Stoke-on-Trent will stimulate fresh criticisms of the ease with which arsenic can be handled and obtained. It is scandalous that a box containing a hundredweight of arsenic could be left about without any supervision or indication of its nature. Local Acts (for example, Section 50 of the recent Manchester Corporation (General Powers) Act) are beginning to include penalties on people who fail to take proper precautions to prevent danger from the presence of disused petroleum vessels on premises. It seems reasonable to deal with potential risk of death from poisoning as drastically as with the danger of death from fire."—*The Lancet*, 1930, **2**: 1258.

Doctor and Patient

Is the doctor to be the sole judge of the number of visits which the patient should receive? To this question, as indeed to many others, the law seems to answer "Yes and No." A patient underwent an operation which, in view of his general health, was serious; he was three weeks in a nursing home, and apparently left it contrary to the doctor's orders. Sued at the West London County Court for the balance of fees due for professional services, the patient said he had expressed the desire that the doctor should not call so frequently. His Honour, Judge Hargraves did not accept this as a valid defence. "It must be for the doctor," he said, "to decide how often he ought to see a patient." At some stage of the convalescence, the personal relations between doctor and patient ceased to be entirely

happy. The patient then wanted to see less of the doctor; he did not actually terminate his contract with the doctor, but he said he was willing to take the risk of reduced attendances. As the learned judge observed, the personal relations between the parties had nothing to do with the matter so long as the professional relationship of doctor and patient continued. The doctor had not chosen the patient; the patient chose the doctor.

At this point the law has satisfactorily answered "Yes" to the question whether the doctor is the sole judge of the number of visits to be paid. Common sense would agree. It is sometimes said that a man who is his own lawyer has a fool for a client; a man who is his own doctor is in much the same position. The contract between doctor and patient is an implied contract; the doctor is to render professional services and to receive reasonable remuneration. The contract must surely assume that the rendering of skilled services is not to be obstructed by the patient's pique or perversity. Though the patient can break off the contract entirely, he can hardly dictate the manner of treatment while the contract endures. But, having answered "Yes", the law now adds "and No". Judge Hargreaves, who has already laid down that it must be for the doctor to decide how often he ought to see a patient, deducts five guineas from the plaintiff's claim because "I have come to the conclusion that after March 7th attendances might have been fewer than they were." The patient had said so, and the patient, it seems, knows better than the doctor after all.

Nor is this the end of our perplexities. According to His Honour's judgment, after the patient had intimated that he was prepared to run the risk of fewer attendances, "the doctor could then, to cover himself, have written a letter to say that the risk of less frequent attendance must be borne by the patient." The purpose of such a letter, presumably, is to furnish prospective evidence for some subsequent tribunal. If the doctor reduces his attendances and the patient dies, the doctor will be able to flourish a copy of the letter in the face of the coroner. Or if an action of negligence is instituted, with allegations of carelessness and inattention, the letter may again be useful. But medical practice cannot be conducted in an atmosphere of lawyers' letters. The doctor must have a free hand in rendering professional service; he does not ask for more than the lawyer himself would claim. —*The Lancet*, 1930, **1**: 520.

Medical Privilege Again

The difficulties of the medical practitioner who is asked in the witness-box to disclose matters of professional confidence were illustrated afresh lately in the King's Bench Division. A practitioner from University College Hospital (subpœnaed to give evidence) asked for the protection of the judge on the ground that his testimony concerned matters privileged as between doctor and patient. Mr. Justice Macnaghten replied that there was no such privilege known to the law and that the witness was bound to answer any relevant question of which he had knowledge. Counsel interjected a remark that the witness was putting forward the view of the hospital authorities, whereupon the judge professed astonishment that the hospital authorities should be so ignorant of their duty. Hospitals, we may guess, are not only concerned with professional etiquette but also dislike the disturbance of medical and surgical services which occurs if their staffs are summoned to spend what may be many hours in the law courts. Legally they are powerless to protest. If a hospital refuses to send a witness, the court can direct the whole personnel of the hospital to attend. This potential threat was held over a hotel manager lately when he showed reluctance to allow his domestic staff to appear as witnesses in divorce cases; it was explained to him that the whole staff of the hotel might be ordered to attend if he made any difficulty.

On the question of medical privilege and the protection of a patient's confidence, the fact that a judge insists on having the evidence should not deter the witness from making his protest. There is a widespread feeling that medical privilege should receive statutory recognition in the interests of patients in general. This change will not be brought about unless public opinion is stirred. It is necessary to keep the matter before the public; every practitioner who protests against being asked to disclose his patient's confidences does good service for this purpose.—*The Lancet*, 1930, **2**: 1034.

"Medical skill and public hygiene will ultimately be racially disastrous if they preserve inheritable mental and physical defects in humanity. We now know that dysgenic mutations can occur alike in plants and animals, as it were spontaneously; at any rate, knowledge as to their origin is lacking. Had we such knowledge, we might, of course, be able to prevent their occurrence. But all we can at present say is that, having appeared, they can be inherited; and unless they are eliminated by a hostile environment they remain a permanent menace to the community. Now medical science destroys the power of hostile environment, but leaves these inheritable characters untouched. To the category of such dysgenic mutations belongs apparently the group which gives rise to mental defect in man. The existence of this type of social degeneracy is a grave menace to our welfare as a community, and the families in which the defect is latent make up inferior racial stocks amounting to some 10 per cent of the whole population. Accurate genetic knowledge is most urgently needed, and a beneficent millionaire, anxious for the future of his country and humanity in general, could well provide laboratories and chairs in all our great universities."—Right Rev. E. W. Barnes, Bishop of Birmingham, at the annual dinner of the Royal Society of Medicine, November 20, 1930.

Abstracts from Current Literature

MEDICINE

Syphilis of the Heart and Great Vessels. Coombs, C. F., *The Lancet*, 1930, **2**: Aug. 2, 9 and 16.

In the first three issues for August of *The Lancet* there appear the Lumleian Lectures by Carey F. Coombs, based on 1,750 autopsies, and also the study of a group of 1,500 collected statistics. Gross cardio-vascular disease is present in every fourth or fifth autopsy and about 10 per cent of these cases are syphilitic. The liability of the cardio-syphilitic to sudden death or permanent disability has a bearing on public and vital statistics. Compensation Boards are alive to the effect of this disease upon the workmen. Nor is the subject of any less importance to the industrial physician. Physical fitness and absence of lues should be a prerequisite to any hazardous employment. Sooner or later there is trauma which may be blamed for damage that is really due to the spirochæte. One-third of the cardio-luetic cases are not diagnosed during life. This discrepancy is probably due to sudden death or to the fact that symptoms may not have developed.

We have been taught that nearly three-quarters of a group of aortic insufficiency cases are luetic and the older statistics seemed to bear this out, but Coombs' group had only one in three cases. Syphilis plays a large part in the causation of thoracic aneurysm (83 per cent), usually in the first part of the aorta, seldom in the abdomen. The frequency of cardio-syphilis in the African negro does not exceed that in the white, but the incidence of aneurysm in the American negro is twice as high.

Neither coronary occlusion nor heart block is common in syphilis, and fibrillation of the auricle has a luetic etiology in only 2 per cent. In a group reported by Levine only 4 per cent of the patients with coronary thrombosis had a positive Wassermann reaction, and of 46 cases examined post-mortem lues appeared in only 2. Cardio-syphilis is twice as liable to cause precordial pain on effort as are the more common forms of cardio-arterial degeneration. The aortic lesions of congenital syphilis develop earlier than in the acquired type, even before the age of twenty, and the male is no more subject to the congenital type than the female. In cardio-syphilis pain without immediate sequelæ is common. The symptoms of infarction are severe persistent cardiac pain, with the addition of new clinical signs indicating change in the texture of the cardiac wall. These are rare in cardiac lues. Accentuation of the aortic second sound in a person without raised blood pressure is highly suggestive of lues. The mitral systolic murmur present with aortic incompetence is more likely muscular than valvular. In luetic aortic incompetence the murmur is more frequent at the right of the sternum, while the "rheumatic" diastolic murmur is often louder on the left. The danger in cardio-syphilis is the interference with muscular function. Fibrillation and flutter are not common accompaniments. The heart tracing may show a slowing of the auriculo-ventricular or trans-ventricular conduction, but normal rhythm is the rule. In the coronary vessels lues usually confines its mischief to the orifices causing pain, whilst atheroma attacks the vessels.

Diabetes was not found in a single example of cardio-syphilis. The supervention of a syphilitic lesion on a rheumatic basis is not so severe as when the reverse is the case. Syphilitics often have cardiac pain but seldom die of infarction. The sino-auricular node and His' bundle often escape.

The prevention and early treatment of the syphilitic infection, with its wholly needless waste of valuable lives, should be the aim of the profession and an enlightened public opinion.

C. R. BOURNE

Radiation Therapy of Polycythæmia Vera Pack, G. T., and Craver, L .F., *Am. J. M. Sc.*, 1930, **180**: 609.

Pack and Craver are of the opinion that radiation therapy is the method of choice in the treatment of polycythæmia vera. The methods which have been successfully employed in reducing the erythrocyte level in this disease are radiation of the spleen, radiation of the long bones, and the use of chemical agents such as benzol and phenyl hydrazine. The authors point out that the site of the initial disturbance is the bone-marrow, not the spleen, as the enlargement of the latter is secondary to increased blood formation. Treatment should therefore be directed towards reducing the output of the bone-marrow. This can be readily accomplished by means of x-ray or radium radiation, as the hyperplastic marrow is particularly sensitive to these rays. The bone pains so common in the disease rapidly disappear, the blood values diminish, and with them the symptoms of vertigo, headache, cyanosis and dyspnœa.

As regard the details of the treatment, the amount of radiation will depend on the degree of polycythæmia. It is the authors' custom to give three to six exposures per week until the cycle is complete, that is until all the long bones have been successively radiated one at a time. The cycle may be repeated in three to six months depending on the results obtained. Four cases are cited. This form of treatment improves the

general health and prolongs life but it does not prevent the ultimate fatal outcome.

E. S. MILLS

A Clinical Study of Gumma of the Liver. Friedenwald, J. and Morrison, T. H., *Am. J. M. Sc.*, 1930, **180**: 656.

Friedenwald and Morrison present a clinical study of gumma of the liver based upon ten selected cases of the disease, which are reported in some detail. All the cases were males between the ages of 32 and 49. The onset of the disease was gradual and characterized by pain over the organ and abdominal distension, followed by nausea and vomiting, with sometimes chills and fever and a mild form of jaundice. Digestive disturbances were present from four months to four years before the diagnosis could be established by the appearance of the hepatic tumour. The spleen was enlarged, and ascites occurred in 3 of the 10 reported cases. The gastric secretion was normal or increased in 8 cases. Achylia occurred in 2. The tumour in the liver may be single, round and smooth, or it may be multiple and nodular. It can best be distinguished from carcinoma and cirrhosis by the therapeutic test. Under the administration of iodides and mercury the tumour, the ascites, jaundice, and symptoms disappear rapidly. The liver and the spleen may return to their normal size.

The authors feel that the administration of arsphenamin is dangerous, and its use is contraindicated in the presence of gumma of the liver.

E. S. MILLS

Treatment of Pernicious Anæmia with Dessicated, Defatted Stomach. Sturgis, C. C., and Isaacs, R., *Am. J. M. Sc.*, 1930, **180**: 597.

Sturgis and Isaacs report further studies of the effect of feeding whole, chopped hog's stomach in a dessicated and defatted state to patients with pernicious anæmia. The stomachs are twelve to eighteen hours old when obtained. The tissue is chopped up, dessicated at low temperature, and deprived of its fat content by means of petroleum benzine. The resulting powder is colourless, odourless, and almost tasteless. Ten grams of the powder are equivalent to about seventy grams of the original organ. The daily dosage recommended is ten grams for each million red cells deficit per cubic millimetre of blood. The increase in the red cell count following this form of therapy is about a half million red cells per cubic millimetre of blood per week for the first eight weeks. When the erythrocyte count has been restored to normal, a maintenance dose of from seven to ten grams daily is advised. The authors have not found stomach extract to be superior to liver in the treatment of the cord changes of the disease.

The investigations have further shown that the muscle coat of the stomach is inert. When the mucosa alone was used only a very feeble reticulocyte response resulted. These findings, taken in conjunction with the published observations of Castle, suggest that stomach extract owes its potency to an enzyme which is elaborated in the gastric mucosa but which must act upon muscle protein in order to liberate or produce the substance active in bringing about a remission in the disease. This enzyme is absent from the stomach of the patient with pernicious anæmia.

E. S. MILLS

Bacterial Hypersensitivity of the Intestinal Tract. Its Treatment with Autogenous Vaccine and Sodium Ricinoleate. Dorst, S. E., and Morris, R. S., *Am. J. M. Sc.* 1930, **180**: 650.

Dorst and Morris have treated successfully, by means of an autogenous vaccine and sodium ricinoleate, a group of cases presenting gastrointestinal symptoms without any demonstrable pathological basis. These cases are often labeled "autointoxication", mucous colitis, or intestinal neurosis.

The authors began their study four years ago by investigating the stools of the patients for abnormal micro-organisms, but without success. They then isolated various members from the normal flora of the intestinal tract as *B. coli communior*, *B. coli communis*, *B. lactici acidi*, *B. fæcalis alkaligenes*, *B. proteus*, *B. cloacus*, *B. proteus*, *B. mucosus capsulatus*, and *S. fæcalis*. The patients were tested for hypersensitivity to each of these organisms by the usual intradermal method. The authors were surprised to find that 26 of 30 patients reacted strongly to one or more, while a corresponding group of controls did not. The patients were then gradually desensitized to the given organism by daily increasing subcutaneous doses of the killed culture, with great clinical improvement.

Morris had made the observation that many patients suffering from this clinical syndrome improved on daily doses of castor oil. This led to an investigation of the effect of this substance on the cultures of these organisms *in vitro*. The result was that killed cultures which gave a strongly positive skin test in a given case before treatment of the culture with castor oil, gave a negative skin test on the same patient afterwards. The organisms were detoxified by the castor oil, though they were found to remain effective in desensitizing the patient. Sodium ricinoleate suspended in olive oil was later found to be just as effective as the castor oil and was more adaptable to clinical use. When sodium ricinoleate alone is prescribed to patients with this symptom-complex, improvement results, but more slowly than when combined with desensitization. The presumption is that this substance exerts a detoxifying action on the organisms in the intestinal tract.

The actual technique of the treatment is as follows. The micro-organisms to which the patient is hypersensitive are discovered by means of the intradermal tests. Stock cultures may

be used but autogenous ones are to be preferred. Vaccines are prepared from the strains to which the patient is hypersensitive. The initial dose is one minim followed daily by increasing doses until four minims, which is given three times weekly for several months. At the same time the patient is given orally a capsule, containing five grains of sodium ricinoleate suspended in olive oil, before each meal and at bed time. This may be decreased as the symptoms subside. The treatment by combined bacterial desensitization and oral administration of sodium ricinoleate will give a large percentage of cures in these cases.

E. S. MILLS

The Dick Test in Pregnancy. Baird, D., and Cruickshank, R., *The Lancet*, 1930, **2**: 1009.

The Dick test was performed on 600 pregnant women, of whom 22 per cent reacted positively, the incidence and intensity of reactions being greater in primiparæ, irrespective of age, than in multiparæ. Among multiparæ the proportion of positive reactions decreased with increasing age; so did the incidence of puerperal sepsis, whereas both remained constant for all ages in primiparæ. Previous streptococcal infection such as scarlet fever, tonsillitis, puerperal sepsis did not appear to influence the reaction to the Dick test. On the other hand, the reaction, previously positive, became negative after a puerperal sepsis, however slight, the tests being made immediately after the pyrexia subsided. When all the cases were reviewed, and those of puerperal sepsis divided from those of pyrexia from other causes, the analysis showed that women who reacted positively to the Dick test were not more liable to develop puerperal sepsis than were negative reactors. However, infection, when it occurred, tended to be definitely more severe in Dick-positive than in Dick-negative cases. The Dick test was therefore found to be reliable as an index of probable severity of infection, but that incidence was much more often associated with difficult or mismanaged labour than with susceptibility as indicated by the test.

J. B. ROSS

Plasma-Protein Loss with Œdema but without Proteinurea. Bennett, T. I., Dodds, E. C., and Robertson, J. D., *Lancet*, 1930, **2**: 1006.

Since the tendency of opinion as to the cause of œdema in nephrosis is towards accepting the theory of depletion of plasma proteins by albuminuria, it was thought of interest to study the plasma content in cases where there was loss of plasma protein by routes other than the kidney. Such instances are found in ascites, especially those forms of ascites where the fluid is rich in proteins. It is to be noted that such cases often show an œdema which is not always limited to the lower extremities and which is not to be explained by pressure effects. Abstracts are given of six cases with blood studies and protein analysis of the ascitic fluid. All had ascites and œdema and in none was there any evidence of renal lesion, either clinically or at autopsy. In all cases there was a definite lowering of plasma proteins, particularly the albumin, and in two instances an actual reversal of the normal albumin-globulin ratio. Although the œdema persisted for long periods it is noted that no renal lesion could be found. This would tend to refute the theory advanced by other workers that renal damage is caused as a late result in nephrosis by the plasma depletion.

J. B. ROSS

Preventive Medicine and Mental Deficiency. Barr, M. W. and Whitney, E. A., *New Eng. J. Med.*, 1930, **203**: 872.

The three major causes of mental deficiency are: (1) accidents or injury at birth; (2) acute illnesses or severe injuries in early infancy and childhood; (3) heredity. In a study of 5,000 cases at Elwyn Training School it was found that in about 6 per cent accident or injury at birth was the direct cause of the mental defect; in 28 per cent the defect was attributable to acute illnesses or severe injuries of early infancy and childhood. The ranking order of these acute illnesses is as follows: encephalitis, meningitis, scarlet fever, gastro-intestinal diseases, typhoid fever, infantile paralysis, whooping cough, diphtheria, chorea and influenza.

Another factor either coincident with, or a factor in the cause of, the mental deficiency was epilepsy. Among the severe injuries listed, the most prominent is injury to the head from a fall, occurring as the causative factor in over 5 per cent of the cases.

In 25 per cent of cases parental idiocy or imbecility was the direct cause of the mental deficiency. In order to combat this condition three things can be done: sequestration and segregation, more stringent laws relative to marriage, and sterilization.

Sequestration or segregation has been practised in the United States since 1848. Of the estimated 1,200,000 feebleminded in the United States only 75,000 are receiving supervised care; little progress can be hoped from that. Certain states have laws regarding the marriage of the feebleminded, and efforts are being made to constantly increase the number.

In the past five years the authors have sterilized 71 patients at the request of their parents or guardians. Generally speaking, it is the higher grades who should be sterilized, for they are more highly sexed and more sexually aggressive. A number of the lower grades have been sterilized, chiefly for their obscene sex habits.

Interviews with 100 parents on the subject found 75 of them favourably disposed toward the subject when it was properly presented to them, and only 7 were definitely opposed. The reasons for the opposition were: adverse religious scruples, fear, and parents of too low mentality to understand properly what was desired. Eight

parents could not decide, and 10 refused to commit themselves for or against the operation. If parents of mentally deficient children are properly approached, and the operations and their results explained, there will be little difficulty in obtaining written consent. It is for the benefit of the remaining 25 per cent who may need the operation because of certain hereditary conditions that it is desirable to have in each state legalized sterilization of the mentally unfit.

LILLIAN A. CHASE

Syphilitic Infection of the Lung. Hutter, H. J., *Am. J. Roentgen. & Rad. Ther.*, 1930, **24**: 427.

A case is presented of a coloured male, aged 32, who for one and a half years complained of pain in the chest, constant coughing of blood, fever and loss of weight and strength. He gave a history of malaria and of syphilis ten years previously. He had had a short course of treatment for each of these conditions. Examination was practically negative except for an old penile scar. The sputum was persistently negative for tubercle bacilli. The blood showed secondary anæmia; no malarial parasites. The blood Wassermann test was two plus repeatedly. X-ray report of chest read, " . . The right upper lobe is the seat of fairly homogeneous consolidation with multiple areas of circumscribed rarefaction, quite likely the result of cavitation. Elsewhere the lungs are clear. The acromial ends of the clavicles both show marked destruction from the medullary side involving the cortex and periosteum. This condition is practically painless." The lesion was thought to be gumma. Antiluetic treatment was instituted and after five months the man had gained 32 pounds, the lesion in the lung had practically disappeared, and the osteomyelitis markedly improved.

N. E. BERRY

The Hereditary Factor in Polyposis of the Intestine, or Multiple Adenomata. Dukes, C., *Cancer Review*, 1930, **5**: 241.

Dukes reviews the literature of this subject extensively, tracing it from the time when polyposis of the intestine was first recognized as a clinical entity by Harrison Cripps in 1882, and its distinguishing feature, namely its hereditary tendency, was described by the same author. The second distinguishing feature of the disease, its tendency to be followed by cancer, was brought out first by Handford in 1890. Despite these classical papers, Dukes comments upon the fact that many text-books of surgery and some of pathology still fail to mention this disease. First or all, it must be differentiated from the occurrence of polypi which are secondary to inflammatory or irritative processes. Examples of the latter may be found in the ragged condition of the mucosa following ulcerative colitis, dysenteric infection, inflammation, etc. These conditions, better described as "colitis polyposa", are characterized by the irregular contour of the tags of mucous membrane, and their attachment along the lines at which the blood vessels pierce the intestinal wall. In true polyposis, on the other hand, the polypi, whether pedunculated or sessile, are predominantly of a smooth, rounded contour, and are evenly studded over the entire surface of the mucous membrane. Secondly, polyposis must be differentiated from the isolated adenomatous polyps of children or adults, and from the crop of minute adenomatous proliferations which often surround the early cancer of the rectum or colon.

One of the points in the differential diagnosis, as brought out by Dukes, apart from the etiology and the macroscopic appearance, is the family history. In true polyposis intestini, there is a family predisposition to this type of growth. The early symptoms are passage of blood, diarrhœa, vague abdominal pains and tenesmus. The only satisfactory method of diagnosis is by the use of the sigmoidoscope, and the only therapy which promises a prospect of cure is colectomy. Polyposis of the intestine is a disease of youth and early middle age; of 40 cases there were two under 10; ten between 10 and 20; ten between 20 and 30; thirteen between 30 and 40; two between 40 and 50; two between 50 and 60; and one between 60 and 70. The affection appears to be commoner in men than in women, according to some authors, but equal in distribution between the two sexes, according to others. The picture is usually terminated by carcinoma of the rectum or colon if the person is not carried off by some other disease.

Many interesting pedigrees are given which leave no doubt that this disease is inherited. The most complete pedigree is that of Jüngling, who examined all the living members of the family whom he could find with the sigmoidoscope. The record extended over four generations, involving 32 persons, of whom 13 were known to have had polyposis intestini, and of whom 5 so far have died of cancer of the rectum. The appearance of the disease is noted first in the second generation, in which there were 6 children. One died of tuberculosis, the second a female had polyposis and died of cancer of the rectum. She had one son who had polyps and died of cancer of the rectum. The third member, a male, was not known to have had polyps, but died of cancer of the rectum. So far, his three daughters and two grandsons have remained free from the disease. The fourth member, a female, had polyps, and died of cancer of the rectum. She had seven children, of whom three daughters and one son have polyps, but have no signs of cancer as yet. Another daughter died of some disease of the rectum, and her son has polyps. A son and a daughter, children respectively of two of the daughters who had polyposis, have inherited the disease. The fifth member of the second generation had polyposis and died of cancer of the rectum, and two of his daughters have polyposis. The remaining member of the second generation died of tuberculosis and so far his three children do not have polyposis.

One other pedigree of Lockhart-Mummery will be given. In the early generations there is no history of polyposis, but it is fair to assume that all those who died of cancer of the rectum had the polyposis existing first. A man died of cancer of the rectum at 42. Of his 9 children, the first 7 died of the same disease at the ages of 46, 52, 39, 54, 27, the ages of the other two are not given. The eighth child is dead, cause unknown. The man, dying at 46, had one son with polyposis, who in turn has two children so far free. The woman, dying at 54, had four children, one daughter with polyposis and dead of cancer of the rectum, the second daughter with polyposis, who has had colectomy performed in order to avoid the fatal termination by cancer.

Such records should stimulate first of all careful examination and history taking by physicians whose patients give a story of such symptoms, thorough examination with the sigmoidoscope of all members of the family, and colectomy in those cases in which polyposis is present.

MADGE THURLOW MACKLIN

Hæmophilia with Hemarthrosis of the Knee Joint. Fairbanks, H. A. T., *Proc. Roy Soc. Med.*, 1930, **23**: 1100.

Although only three generations of the family are reported upon in this article, the author states that the condition had been known to exist in the family for six generations. In the last two generations, eight of the nine males afflicted with the disease had bled to death. The patient who was a boy of nine years, had suffered from hæmophilia ever since he was ten months old. The disease manifested itself in him as a tendency to epistaxis, hæmaturia, melæna, and hæmorrhages into the joints. He was admitted for a swollen, painful and immobile joint, in which there was visible with the x-rays marked disintegration. The laboratory findings were R. B. C. 4,680,000; platelets 244,000 (a normal count); and a coagulation time of nine minutes and forty-five seconds by the Dale and Laidlaw's method, the normal being less than two minutes. Treatment consisted of a Thomas splint for the knee.

The pedigree was as follows. A woman whose brother was a bleeder, and in whose family hæmophilia had existed for the last three generations, married, and like most females in these families produced a large number of offspring, six daughters, four sons who were bleeders and bled to death, and three normal sons. One of the latter married and had four normal children. Five of the six daughters married; two had only normal children and grandchildren, one had one son, a bleeder, the patient of the above report; another had three daughters and two sons, the latter two bleeding to death, and the last had one daughter and two sons both of whom died of the disease.

It seems incredible that people will go on reproducing offspring who are doomed to suffer with this disease, when the whole train of tragic events could be halted by the self restraint of just one generation. If none of the affected males, and none of their sisters would marry, the disease would be permanently stopped as far as that family was concerned.

MADGE THURLOW MACKLIN

Ueber familiäres Nasenbluten als Ausdruck einer Pseudo haemophilie. (Familial nosebleed as an indication of pseudo-hæmophilia). Curschmann, H., *Klin. Wchnschr.*, 1930, **9**: 677.

The importance of not calling every disease in which there is a tendency to undue bleeding, hæmophilia without the verification of the laboratory findings is exemplified in the two families reported in this paper. Both families were Jewish; both exhibited excessive nosebleed; both showed laboratory findings far from those characteristic of hæmophilia. The first family was that of a man who had suffered from severe epistaxis ever since the age of puberty, and finally died in old age of an attack more severe than usual. He had 11 children, 6 of whom were normal, 5 of whom inherited their father's defect. One, a woman, died at 58 of nosebleed; another sister was living at the age of 49, but subject to attacks of bleeding from the nose; a brother had died at 56 from nasal hæmorrhage, another brother was alive at 55 and a third at 54, but subject to frequent incapacitating attacks of hæmorrhage from the nose. In all cases but the last the tendency to bleed began at the adolescent period; in the last case the man was 25 before the attacks began. The two sisters never had profuse menstruation, or undue bleeding at childbirth. The patient, one of the brothers, had hæmorrhoids that did not bleed, a hypertrophied prostate, a liver and spleen that were decidedly palpable below the costal margin, telangiectatic spots on the cheeks and palate, a hæmangioma on the lower lip, carious teeth, swollen bleeding gums. No venous dilatations were visible in the nose or larynx. The platelet count was normal, as was the coagulation and bleeding time. The author calls it a "pseudo-hæmophilia", and thinks that there was probably a temporary thrombocytopenia at the time of the hæmorrhages which disappeared immediately after, so that the platelet count appeared normal. Inasmuch as telangiectases were found on the cheeks and lips, the question naturally arises, were there not similar venules present on the nasal mucous membrane that were invisible but which formed the bleeding points for the origin of the hæmorrhages? Such a diagnosis of telangiectasia would fit in with all the clinical and laboratory findings as well as the mode of transmission in this case.

The second family, reported by Curschmann, was of a Jew aged 54, whose mother's brother had suffered from nosebleed. This patient had such severe hæmorrhages that it was said that he literally swam in blood. There were no visible angiectatic spots as in the other case, there was no enlargement of the liver or spleen. The platelet count, clotting time and bleeding time were normal. Here again the author thought of a temporary thrombocytopenia which could be

demonstrated only during the time of the actual hæmorrhage itself. For therapy in both cases he advised Roentgen rays over the spleen.

MADGE THURLOW MACKLIN

SURGERY

Post-Operative Pulmonary Atelectasis. Brunn, H., and Brill, S., *Ann. Surg.*, 1930, **92**: 801.

In a study of 456 post-operative patients, 22 cases of atelectasis, 9 of pneumonia, and 2 of embolus were noted. The former is thus the predominating post-operative pulmonary complication. Five point seven per cent of the cases of atelectasis occurred after spinal anæsthesia. The lesions may involve any portion or all of the lung tissue. The most important causative factor is bronchial obstruction. Length of stay in hospital appears to be another factor; thus patients kept in hospital two weeks or more prior to operation had 4 times the number of pulmonary complications shown by a group kept in hospital only 2 to 3 days pre-operatively. Previous flat position with elevation of the feet, post-operatively, is still another factor.

Four types of findings were noted bronchoscopically: (1) an obstructive plug or tenacious sputum; (2) a profuse purulent secretion; (3) no secretion in bronchi; and (4) one unusual case of local bronchial œdema.

Treatment consists in short hospitalization before operation; the Fowler position post-operatively, with frequent turning, CO_2 inhalations, bronchoscopic aspiration where indicated.

Prognosis is excellent unless the lesion is accompanied by a secondary process.

STUART D. GORDON

The Effect of Acute Experimental Cholecystitis on the Emptying of the Gall-Bladder. Murphy, G. T., *Arch. Surg.*, 1930, **21**: 300.

The author has followed up the work of Mann, who in 1921 produced, experimentally, specific cholecystitis by the intravenous injection of Dakin's solution (a solution of chlorinated soda). No attempt was then made to show that the gall-bladder emptied, though subsequently many attempts have been made to produce chemical cholecystitis by the use of chlorinated soda, following the discovery that the gall-bladder emptied after the injection of a meal of fat, but because of the variation in the commercial product positive results were not attained. Murphy has tried to determine whether or not an acutely inflamed gall-gladder empties and to what extent such emptying occurs after a meal rich in fat. Pathological changes were produced within the wall of the gall-bladder by the intravenous injection of varying amounts of "eusol" (a solution of chlorinated lime and crystalline boric acid). Animals were starved for from three to four days prior to operation and explored four hours after the administration of a meal of egg-yolk and cream. Rather marked distension of the gall-bladder was found in all animals graded 1 to 3, inclusive. If cholecystitis was graded 4, the gall-bladder was always found to be smaller than would have been expected from the size of the animal. The bile did not appear to be thickened or as concentrated as in the normal animal. The biliary tract was found to be dilated in cases of advanced pathological changes, although changes could not be detected about the cystic or common bile ducts. That the ducts were patent has been confirmed repeatedly, both at operation and at necropsy, by pressure on the gall-bladder, as well as by histological examination. Jaundice was not observed in any instance. The cystic and common bile ducts play little if any part in this pathological entity, for at no time did the hæmorrhagic exudate extend to that particular region. Bile could enter the cystic duct without difficulty. Roentgenograms were made of the diseased gall-bladders after the injection of rose bengal intravenously, and the administration of a meal rich in egg yolk and cream. In only one instance did the acutely inflamed gall-bladder show any evidence of emptying. From his observations Murphy concludes that the acutely inflamed gall-bladder does not empty after the usual test meal.

G. E. LEARMONTH

Painful Postoperative Abdominal Scars. Bancroft, T. W., *Arch. Surg.*, 1930, **21**: 289.

Bancroft believes that a considerable number of patients with post-operative soreness of their wounds, often of enough severity to interfere with the pursuance of their daily routine, have neuromas in the abdominal scar. The proof of the existence of this lesion is very difficult, microscopically, owing to the smallness of the nerves traversing the scar tissue, and their identification in the excised tissue is almost impossible. The author bases his deductions on a study of four such cases, where the symptoms and pathological changes were due to neuroma or traumatic neuritis of the lower thoracic nerves and gives the following data.

In three cases the injection of procaine hydrochloride into the fascia of the right rectus muscle relieved the pain for various periods of time; the patients in three cases were relieved from symptoms by excision of the scar tissue *en bloc*, without opening the peritoneum; in the fourth case the peritoneum was opened to inspect the abdominal viscera and there was not sufficient pathological change in the peritoneal cavity to account for the patient's symptoms.

The peripheral pain in amputation stumps has been definitely shown to be due to neuroma and the microscope has confirmed the diagnosis. Bancroft believes that the methods of operative approach for the abdominal cavity must be reconsidered. The tendency has been to attempt to follow muscle planes, and frequently to sacrifice the accompanying nerves. Incisions should be planned to avoid injury to the nerves of the abdominal wall.

G. E. LEARMONTH

The Problém of Cancer of the Stomach. Saltzstein, H. C., and Sandweiss, D. J., *Arch. Surg.*, 1930, **21**: 113.

The toll of deaths from cancer of the stomach is a large one, as almost 35 per cent of all deaths from cancer are due to this group. The present study is based on an analysis of 365 consecutive deaths from cancer of the stomach, collected through the Cancer Division of the Department of Health, Detroit. Of these, 213 were observed in hospitals and 152 were not. The authors have endeavoured to elucidate: (1) the present average situation as regards diagnosis and treatment; (2) the chief difficulties and commonest errors in both recognition and therapy; and (3) the possibilities for improvement and control.

The popular pessimism concerning cancer of the stomach is well founded, as only 3 per cent of those who died had had the chance of cure which operative recovery from radical resection represents. The series covered one and a half years, and included all deaths registered as having been caused by cancer of the stomach, in a population of 1,730,000 during that time.

Early recognition is a requisite in the management of cancer, hence they analyze 300 of the 365 charts with special reference to early symptoms. Of 287 of these cases 24.7 per cent had had long preceding indigestion, while in the remaining 216 there had been previous good health. The first symptoms in the latter group were those of indigestion, pain in the epigastrium, vomiting, etc. Among the atypical symptoms there were loss of weight, loss of appetite, atypical pain not in the upper part of the abdomen, anæmia and diarrhœa. In 91 of these 216 patients there was a sudden onset of indigestion. In the former group of patients there was in the great majority a preceding indigestion of over three years standing. Fifteen per cent of the total 300 cases had a history of gastric ulcer definite enough to be described as such. Sixty per cent were examined by x-ray yet the authors feel that roentgenological diagnosis is not accurate enough in the early determination of a malignant condition to be used to the exclusion of other clinical interpretations. As for operative measures the authors are satisfied that gastric resection is a better palliative measure than gastro-enterostomy as patients are more comfortable following it, and those with nodules in the liver have lived three years after gastrectomy for cancer. Hence they advise that more gastrectomies be performed.

G. E. LEARMONTH

Hereditary Predisposition to Hernia. Birkenfeld, W., *J. Am. M. Ass.*, 1930, **94**: 1633.

In the etiology of hernia, heredity plays the major role, according to this author, not only evidencing itself as inherited hernia, but the localization of the hernia and its variability are also inherited. Thus in a family in which inguinal hernia has shown itself, the other members are more apt to exhibit inguinal than umbilical hernia. There is another factor besides the predisposition to hernia which enters in and so makes the hereditary picture somewhat obscure, that is, the strain to which the person is subjected. Hence we see hernia, especially of the inguinal type, far more frequently in males than in females, due to their greater physical activity, in conjunction with the developmental differences in the inguinal regions in the two sexes. Birkenfeld states that if there is a history of heredity in the case of hernia, recurrence of the difficulty after operation is found in 11 per cent of the cases, whereas if there be no history of hernia in the family, recurrence is noted in but 4 per cent of the patients. This striking difference gives a quantitative estimate of the relative roles of heredity and environment in the production of this defect.

MADGE THURLOW MACKLIN

OBSTETRICS AND GYNÆCOLOGY

Albuminuria of Pregnancy and its Late Results. Bannister, J. B., *Brit. M. J.*, 1930, **2**: 857.

About 30 per cent of all patients during pregnancy and labour exhibit albumin in the urine. About seven-eighths of these only show albumin in the urine during the labour itself, and its presence may be regarded simply as the expression of severe muscular effort. To what extent does albuminuria in pregnancy, which occurs in the other one-eighth, influence the subsequent history of the individual? One is struck with the absence of statistics on this point. Investigations should be extended over at least five years and should bear upon the course of future pregnancy and the general health of the patient.

It is often difficult to classify the various states in which the albuminuria of pregnancy occurs. Clinical types do not always exist pure. In deciding to which group a given case belongs the author relies upon the information obtained by reading the clinical history rather than by laboratory investigations.

We have to answer, if possible, the following questions:—

1. When a patient develops a mild albuminuria in pregnancy, with, perhaps. a slight œdema, with no marked rise of blood pressure, and a generally unimpaired state of health, is she likely to show in future years or in future pregnancies any evidence that her kidney has been permanently damaged?

2. Is a patient who suffers from chronic nephritis likely to display a progressive deterioration of kidney function in future pregnancies?

3. Is a patient who has been the subject of a true eclampsia or a pre-eclampsia likely to suffer in a similar manner should she become pregnant again?

4. Does the toxic albuminuria of pregnancy play an important part in the etiology of chronic nephritis?

The first question is to be answered in the negative. The answer to the second is in the affirmative. Gibberd says "Pregnancy is the most

delicate test of renal efficiency." The kidney in this class of case is increasingly unable to stand this test.

No dogmatic pronouncement can be made upon the third question. In about 30 per cent of cases there is a tendency towards either recurrence of the actual condition in subsequent pregnancies or towards some other complication of that pregnancy, such as ante-partum hæmorrhage, abortion, or intra-uterine death of the fetus in the later weeks.

An attack of pre-eclampsia or eclampsia of short duration is less likely to be repeated than one which has been spread over many weeks. These albuminuric cases should not, therefore, in the absence of signs denoting definite improvement, be subject to overlong treatment, but termination of labour should be practised, say, after ten days.

Blood pressure bears as important a relation to future events as it does to present condition. In the cases studied no case of recurrent albuminuria was found in which the systolic blood pressure during the initial attack was under 150 mm. When in convalescence the blood pressure remains constantly raised, or when albumin persists over more than two or three months after delivery, it may be expected that the patient will present symptoms in a subsequent pregnancy.

The importance of early recognition of pre-eclamptic states is stressed. Once they occur, treatment should be energetic and thorough. Such patients should not be treated too long. Prolonged treatment may defeat its object and leave the patient more subject to recurrent attacks. Should recovery not be noted, say, in seven days, radical measures should be adopted. Though eclampsia could not be treated by Cæsarean section, there is scope for this operation in the severe toxæmias of recent origin.

Mental symptoms occur comparatively commonly after severe albuminuria in pregnancy. From 15 to 20 per cent of known eclamptics exhibit a confused mental state, which may even extend to mania. As a rule their recovery is complete and generally fairly rapid.

To the fourth question the author can give no answer. For the elucidation of this point we must invoke the assistance of physicians.

ROSS MITCHELL

The Roentgen Ray as an Adjunct in Obstetric Diagnosis. Matthews, H. B., *Am. J. Obst. & Gyn.*, 1930, **20**: 612.

A positive roentgenogram of the fetal skeleton is proof of the existence of pregnancy. This may be added as a fourth positive sign of pregnancy and may be obtained as early as the 14th to 15th week in 15 per cent of cases; at 16 to 18 weeks in 75 per cent; and beyond the 18th week in 100 per cent of cases. A positive diagnosis of normal and abnormal pregnancy, including many types of fetal malformations, can be made by the roentgen ray, provided that the pregnancy is at or beyond the 18th week. The farther advanced the pregnancy, the easier is the diagnosis. A positive diagnosis of fetal death can be made by Roentgen ray, apparently within three or four days after death, provided that the pregnancy is at or beyond the 16th week; of pregnancy complicating fibroids of the uterus, provided that the duration of the pregnancy is 16 weeks or more; and differentiation between pregnancy and other pelvic tumours (soft myoma, ovarian cysts, etc.), provided that the pregnancy is at or beyond the 16th week.

The filming dosage herein recommended (one-half or less of the 25 radio-units which produce biological results) is perfectly safe for the fetus.

Every patient who is a candidate for Cæsarean section should have a roentgenogram to determine whether or not the child is normal. A positive roentgenogram may be offered in court cases as proof that pregnancy exists. It is highly desirable that the obstetrician cooperate with the roentgenologist and thereby help to further develop, simplify and popularize a very important adjunct in obstetric diagnosis.

ROSS MITCHELL

The Present Status of the Treatment of Carcinoma of the Cervix Uteri. Zweifel, E., *Am. J. Obst. & Gyn.*, 1930, **20**: 595.

The methods of treatment for carcinoma of the cervix are: (1) surgery; (2) irradiation; (3) surgery plus irradiation. Radical total extirpation can be carried out either vaginally or abdominally. Either method can be combined with irradiation. Irradiation therapy may be produced by means of x-ray, radium, or both. The absolute percentage of cures by radical abdominal surgery is 20 per cent; by radical vaginal surgery, 17 per cent; by irradiation therapy only, 17.7 per cent. Irradiation may be combined with surgery, as pre-operative, post-operative, or pre-and post-operative irradiation. It is impossible, at present, to determine which procedure is the best, but the combination of irradiation and surgery produces better results than surgery alone. Surgical operations should never, therefore, be performed without irradiation. The greatest advantage which irradiation possesses is that it is possible by it to cure a certain percentage of inoperable cases. Irradiation has practically no primary mortality.

The results obtained in the struggle against malignancy are, unfortunately, still very unsatisfactory; this is especially unfortunate in carcinoma of the cervix which can be diagnosed early and without much effort or skill. Physicians as well as the laity must be educated and aroused to the necessity for early diagnosis and treatment. Women must be taught to present themselves for every irregular vaginal bleeding. Here lies the duty and functions of the Committees on Cancer Control and Hygiene of the League of Nations. Funds must be donated and used for this purpose, even as they are for the control of epidemics.

ROSS MITCHELL

The Treatment of Salpingitis by Local Injection of Turpentine. Little, H. M., *Am. J. Obst. & Gyn.*, 1030, **20**: 582.

The method followed is to open the abdomen in the midline, the peritoneum being protected by rubber sheeting, and carefully release adhesions, either with the finger or by blunt dissection. Tubal masses, when present, are evacuated by means of a syringe with a fairly large needle, after which the syringe is changed and the same needle used to inject a variable quantity of 10 per cent turpentine and oil. No attempt is made to prevent this solution from exuding into the pelvic cavity. The omentum is not brought down, but in each instance the uterus is suspended either by the Olshausen or the Baldy-Webster method. The only satisfactory ligature for any suspensory operation is silk. The appendix, involved in most cases, is removed in practically all. The method has been used not only in the chronic cases but in the very acute, and up to 70 c.c. of the solution has been injected without ill effect. None of these women were spayed. Ninety per cent of the cases were permanently relieved of pain. In the vast majority inflammatory masses ultimately disappeared within a period of four to six months sooner when medical diathermy was used. The method is simple, absolutely safe and particularly adapted for use in general. A brief summary of 76 cases is given.

ROSS MITCHELL

Post-Puerperal Disabilities in Women. White, R. K., *J. State Med.*, 1930, **38**: 641.

"Having put our hand to the plough in the matter of ante-natal and maternity clinics, it is necessary to drive the furrow to the end by also giving post-puerperal services . . . . The present great amount of post-puerperal ill-health is a greater blot than is the present maternal mortality figure." Statistics from various sources are quoted to indicate the frequency with which parturition is followed by ill-health and the pressing need of attention to this highly regrettable situation. Minor injuries of childbirth are frequently discoverable only after the lapse of several weeks. Many women feel that they cannot afford to consult the physician for what may seem to be very trivial conditions. The effort should be made to impress upon all women who attend at antenatal and maternal clinics the importance of returning for post-puerperal examination. Obviously this involves the establishment of a post-puerperal clinic at which all post-puerperal conditions can be dealt with effectively. White considers that the maternity hospital should be provided with an out-patient department, and with beds, operating rooms, etc., for post-puerperal patients requiring ward accommodation.

W. H. HATTIE

PÆDIATRICS

Phenylethyldantoin in the Treatment of Sydenham's Chorea. Ray, H. H., and Cunningham, J. S., *Am. J. Dis. Child.*, 1930, **39**: 1205.

This seems to be the first published report on the use of nirvanol in chorea in which alternate cases were used as controls. Twenty-five cases were studied, thirteen of which were treated with nirvanol, in dosages of 0.3 grams daily for the younger children and 0.6 grams daily for the older children, continued for seven to nine days. These Rochester workers noted sedative effects on the second or third day, fever usually on the seventh, and the rash usually on the ninth day. The exanthem in the majority of patients was urticariomorbilliform, with a concomitant leukopenia, and in two cases was scarlatiniform with a leukocytosis. Marked eosinophilia invariably accompanied the rash. One case developed fever but no rash; in another there was neither fever nor rash. No permanently harmful effects were seen in any case. With the appearance of the nirvanol rash the choreic symptoms were exaggerated. When the nirvanol sickness subsided, the symptoms rapidly abated.

Treatment of control cases was varied, and included luminal, potassium arsenite, salicylates, ketogenic diet, ether-in-oil by rectum. The mean duration of symptoms in the control group was 115 days, in the nirvanol group 31 days. (The difference is over four times the probable error.) The response was less marked in mild than in the severe cases. Recurrences were no more frequent in the nirvanol than in the control series. Active carditis was not aggravated. Frequent blood counts obviated the danger of damage to the bone-marrow.

The authors do not claim that all chorea patients are benefited. In their experience nirvanol was more effective than any other drug in the treatment of chorea.

A. K. GEDDES

UROLOGY

Nephroptosis. Deming, C. L., *Am. J. Surg.*, 1930, **9**: 218.

This report comprises 55 cases which were completely studied. All cases presented a complex train of symptoms referable to the urinary, gastro-intestinal, biliary and nervous systems, and had passed from one branch of medicine to another without relief. Fifty-one per cent were on the right side and 11 per cent on the left; 19 per cent were bilateral; 7 per cent showed general visceroptosis. In all these last the liver was low, and in 40 per cent there was a long right lobe. Twenty per cent of the low kidneys were rotated through one or more planes up to 180 per cent. The function was modified only in cases with long-standing infection and in most of these there was a slight hydronephrosis. All cases had either a stricture, kink or tortuous

ureter. This is to be expected, since the ureter in these cases is redundant and must therefore have an abnormal course when the kidney drops. Similarly the strictured ureter elongates, producing angulation or curves.

In the treatment of nephroptosis the emptying time of the renal pelvis must be made to fall within normal limits. This may, in many cases, be accomplished by ureteral dilatation, and irrigation if infection be present; but when the ureter is very tortuous and the kidney very low operative treatment is to be advised. Operation should aim at completely freeing the ureter and restoring the kidney to its normal position.

The author has devised an operation which holds the kidney permanently in position, without fixing it, and does not damage the parenchyma or capsule. The kidney is exposed from the loin in the usual manner. The surrounding fat is all stripped off the kidney which, with its vessels and ureter, is then delivered into the wound. It is important that all adhesions be removed from the upper as well as from the lower pole. The ureter is then carefully freed. Special attention is given to the kidney fossa and if necessary the right lobe of the liver must be freed to allow ample space. The kidney can be made to occupy practically an intrathoracic position and the ureter will thus be straightened out. The upper pole should be carried medially and the lower pole outward, to give dependent drainage to the lower calyx. A series of interrupted sutures is placed through the perirenal fascia and peritoneum to the quadratus muscle. The first suture should be placed about one centimetre from the ureter and as high up as possible on the quadratus muscle posteriorly. A series of 5 to 8 sutures is necessary to close this aperture. This forms a basket sling so that it is impossible for the organ to descend. The suture line is then re-enforced by bringing up all the extraperitoneal fat and suturing it with two or three mattress sutures to the quadratus muscle; below the other line of sutures and obliterating the space previously occupied by the kidney.

None of the cases developed complications and the symptoms were completely relieved in every case except one in which there was marked dilatation and infection, and this was considered to be due to an error in application of the operation. Follow-up examination showed that the patients remained well and 6 out of 7 cases that had had kidney infection cleared up after operation.

N. E. BERRY

Hydronephrosis Due to Kinking of the Upper End of the Ureter. Rowlands, R. P., *Brit. M. J.*, 1930, **2**: 681.

Hydronephrosis is usually due to obstruction of the flow of urine along the ureter. The obstruction may be due to a stone in the ureter, a stricture or kink of the ureteral wall, pressure from outside from an abnormal vessel, fibrous band or tumour, or to a valvular condition of the upper end of the ureter. This latter abnormality is sometimes bilateral. Frequently there is congenital narrowing at the junction of the renal pelvis and ureter, and sometimes there is a valvular fold of mucous membrane at this point, or the ureter may run down some distance into the wall of the pelvis before opening into it. If any one of these conditions is present any distension of the pelvis results in a valvular obstruction of the ureter. This is aggravated by a mobile kidney.

Repeated attacks of pain in the loin, both back and front, are complained of. This usually starts in early adult life. The pain rarely radiates. Dysuria or abnormal urine is infrequent. The attacks gradually become more frequent and severe. A renal swelling may be noted during the attack. Eventually a typical hydronephrotic swelling develops and, occasionally, pyonephrosis, with or without pathological urine. At operation the renal pelvis and ureter are examined carefully. Any abnormal vessel or band is divided. If no stone, band or vessel is present a diagnosis of valvular obstruction is justified. It is best treated by (1) enlarging the outlet, or by (2) anastomosis between the lower pole of the distended pelvis and the ureter.

STUART D. GORDON

Foreign Bodies in the Urethra. Jeck, H. S., *Am. J. Surg.*, 1930, **9**: 335.

The author reports 14 cases of stone lodged in the urethra and 3 cases of other foreign bodies. These 3 latter comprised a coiled rubber tube, a hat pin and a fragment of bone. The case which presented the fragment of bone is reported in detail. The bone was situated just anterior to the penoscrotal junction and was thought to be a calculus. After all attempts at manipulation had failed and urethrotomy had been decided upon one last attempt finally brought the bone. This patient had had a fractured pelvis with ruptured bladder three years previously and this undoubtedly accounted for the fragment.

In another case the stone was lodged mid-way in the pendulous urethra and could not be removed even after a perineal urethrotomy. It therefore became necessary to open directly on the stone and this was done on its dorsal aspect. The patient has a persistent fistula to this day. This is a frequent, though not an invariable, result when the pendulous urethra is opened, and reminds one that this operation should never be lightly undertaken. A perineal urethrotomy, on the other hand, always heals without difficulty if properly done.

N. E. BERRY

Ureterocele. Dawley, W. A., *Arch. Surg.*, 1930, **21**: 458.

Ureterocele is defined as an intravesical bulging of the lower end of the ureter. The end of the ureter covered with vesical mucosa bulges into the bladder like a bubble or cyst at one or both

ureteral orifices. As to causation, the significant factor is the existence of obstruction at the ureteral meatus. The wall of the ureterocele consists of two layers of mucous membrane; the inside is lined by ureteral mucosa and the outer surface by vesical mucosa. Urinary calculi are often associated with this condition. The ureters are usually thin walled, dilated or tortuous. The renal pelves are dilated and there is some degree of hydronephrosis or pyonephrosis. Cystitis is frequently present. The symptoms are varied and depend on the size and situation of the tumour or the presence or absence of infection. There may be no symptoms and the condition may be found accidentally. Dull aching pain is often complained of in the flank, often radiating to the bladder; or the patient may be acutely ill and have acute colicky pain, accompanied by fever and a leukocytosis. The treatment is surgical, varying from simple splitting of the cyst with suturing of the two mucous layers, to complete resection and circular suturing of the mucosa by the suprapubic route. If the kidney has been seriously damaged, a nephrectomy will be necessary. Resection of the tumour, with transplantation of the ureter into the bladder at another point, may be done. The author reports two cases in neither of which was a positive diagnosis made by cystoscopy. In both cases pyuria had been a persistent symptom, and unilateral nephrectomy was performed in both instances. In one case the ureterocele was resected transvesically; in the other it was not disturbed.

G. E. LEARMONTH

OPHTHALMOLOGY

Sclerosis of the Retinal Arterioles. Wagener, H. P., *Arch. Ophth.*, 1930, 3: 335.

Sclerosis of the retinal vessels affects vision in the main only when it becomes sufficiently advanced to interfere with the nutrition of the retina, or when it is complicated by hæmorrhage or œdema. In 1876, Gowers called attention to the generalized reduction in size of the retinal arteries in certain patients with chronic Bright's disease, associated with increased arterial tension. In 1889, Raehlmann described sclerosis of the retinal vessels, emphasizing tortuosity and attenuation of the arteries, patchy narrowing of the lumen at circumscribed points of the course of the vessel, and white sheathing as important signs. In association with these changes he found compression of the veins at crossings of arteries, ectasia in the veins, mainly peripheral to the point of compression, and white sheathing of the veins. He called attention to the fairly frequent occurrence of locomotor arterial pulse, and peripherally progressive venous pulse. Raehlmann also described sclerosis of the retinal vessels, the result of local retinal disease, the main features of which were narrowing of the blood stream in the arteries, with or without visible thickening of the walls of the vessels, the appearance of white lines along the vessels, and at times ultimately the transformation of the arteries into opaque white strings. This latter event is probably due to arterial thrombosis.

To facilitate the recognition of sclerosis of the retinal arteries, which can be interpreted as a part of the diffuse vascular disease, Wagener suggests four types; consecutive (hypertension), primary, secondary (post-inflammatory), and senile. The pathological changes underlying the ophthalmoscopical picture of sclerosis of the retinal arteries are not accurately understood. The pathogenesis of the sclerosis occurring in association with general arterial disease is obviously the same as that of arteriosclerosis in general. In 1876, Gower stated that in a retina free from local disease any marked change in the vessels might be given as evidence of a similar change throughout the vascular system, and that the contraction of the retinal arteries seen in certain cases of chronic Bright's disease is always associated with cardiac hypertrophy. Many authors have elaborated on these general statements in which Gower furnished the frame-work for the interpretative study of the retinal vessels in their relation to systemic vascular disease. Lesions in the retina which can justly be considered as complications of sclerosis of the retinal arteries are aneurysm, spasm, hæmorrhage, thrombosis of the retinal vein, and arteriosclerotic retinitis.

Hæmorrhage of the retina in association with retinal arteriosclerosis, as distinct from retinitis and venous thrombosis, belongs, as Lange and Lange have pointed out, to the picture of hypertension and not to that of general arteriosclerosis. Moore's description of the retinitis of arteriosclerosis is the only one thus far available. He believes it due to local arterial disease, and not to renal factors. It is characterized by the addition to sclerosis of the retinal arteries of hæmorrhages and of bright white spots or dots of exudate, without evidence of surrounding œdema. The tenure of life of the patients is uncertain. Although they may live a number of years, they usually die of cerebral hæmorrhage or cardiac failure.

S. HANFORD MCKEE

The Treatment of Ocular Tuberculosis with Tuberculin. Gay, L. N., *Arch. Ophth.*, 1930, 3: 259.

The successful use of tuberculin in the treatment of ocular tuberculosis has been challenged by a number of internists as well as by ophthalmologists. There is undoubtedly some justification for this, and it is unanimously agreed that if improperly given, tuberculin in eye diseases can do more harm than good. Gay summarizes his article as follows:

1. Thirty patients with ocular tuberculosis, choroiditis, chorio-retinitis, uveitis, scleritis, iritis and intra-ocular hæmorrhages, were treated with the tuberculin Denys. 2. Tuberculin may be used intradermally as a diagnostic method and

subcutaneously as a safe method of treatment. 3. The use of minute doses of old tuberculin (0.001 mg.) in the diagnosis of the disease is more accurate and is safer than the use of large doses (from 1 to 5 mg.). 4. The treatment consists of subcutaneous injections of bouillon filtrate, beginning with 0.000001 mg. and gradually over a period of months reaching a maximum dose of 100 mg. The maximum dose should then be repeated at weekly intervals for at least three months. 5. The use of a bacillus emulsion leads to inaccuracy because of the infinitely small dilutions which are used in this treatment (1:100,000,000). 6. Constant observation of the eyes is of the greatest importance. A focal reaction should be avoided; if it occurs, the subsequent dose should be reduced to a level of safety. 7. The thirty patients presented here are a selected group who had been treated unsuccessfully by other ophthalmologists before they were admitted to the Wilmer Clinic. In this clinic no abnormality was found, other than tuberculin hypersensitivity, to account for the disease. The result of treatment has been restoration of impaired vision with the arrest of a disease which ultimately would have blinded the patient. 8. Tuberculin does not produce healing by a non-specific reaction; the healing is due possibly to an immunological desensitization of diseased tissue. 9. In order that patients with ocular tuberculosis may be properly treated, ophthalmologists must appreciate the wide difference between immunological antigens and chemical reagents. 10. The use of tuberculin should never be considered in the treatment of a patient with a diseased eye, unless all foci of infection have been removed. It should be used if after a lapse of from three to six months the removal of infection fails to bring about improvement.

S. HANFORD MCKEE

NEUROLOGY AND PSYCHIATRY

Etiology of General Paralysis of the Insane. Power, T. D., *J. Ment.* Sc., 1930, **76**: 314, 524.

In any infection the soil is of as much importance as the seed. Heredity in the etiology of general paralysis has had little consideration since its syphilitic origin was demonstrated. Sir Maurice Craig has said "Heredity does not play a very important part in the causation." Power takes exception to this view. He points out that when infectious and toxic states are followed by mental disorder evidence of a psychopathic ancestry is elicited too frequently to be pure coincidence. Study of one year's admissions to the Brentwood Mental Hospital shows a history of insane heredity in 30 per cent of male general paralytics, as against 25 per cent of other mental cases. Power is persuaded that heredity is of such definite importance that those who contract syphilis and who give a bad family history should receive special attention at the venereal clinics. "May not these be just the individuals whose cerebro-spinal fluids remain positive in spite of prolonged and energetic treatments?"

Dattner is quoted as declaring that the spirochæte has been demonstrated in the cerebral tissues as early as six weeks after infection. While it is estimated that only about 4 per cent of syphilitics develop paresis, Power considers it probable that all persons whose cerebro-spinal fluids persistently give a positive Wassermann reaction ultimately show nervous symptoms of some sort. Coincidentally with decline in the prevalence of alcoholism in England there has been a decline in the general paralysis admission rate. Power argues that it is "reasonable to infer that when the two toxins of syphilis and alcohol are acting simultaneously on the same nervous system, the one will reinforce the effects of the other, and hasten the degenerative process." The decline in the general paralysis admission rate has also synchronized with the use of arsenobenzol preparations in the treatment of syphilis, and with a gradual shifting of the age incidence of the disease in the direction of the older age-groups. Power hesitates, for a variety of stated reasons, to assert that these preparations have had a part in reducing the incidence of general paralysis. "All things considered, it would appear that their influence in this direction has been very slight, and the writer is convinced that it is positively harmful to employ such preparations in the treatment of so-called parasyphilitic diseases of the nervous system unless they are combined with one or other form of pyrexial therapy."

It has recently been suggested in psychiatric circles that the clinical manifestations of general paralysis are altering in type, that the physical signs are not so constant as they were formerly, and that the patients live longer even when treatment is withheld. Our author's statistical investigations of two series of admissions, in which malarial therapy did not come into the picture, do not confirm such opinions. Any marked variations in these particulars which may be shown in subsequent statistics may be attributed to malarial therapy.

W. H. HATTIE

The Etiology of Dementia Præcox. Shaw, W. S. J., *J. Ment. Sc.*, 1930, **76**: 314, 505.

The author has been medical superintendent of the Burma Mental Hospital and of the Central Mental Hospital, Poona, India. After reviewing the commonly held theories respecting the etiology of dementia præcox, he discusses the great prevalence of this condition among Parsis, as contrasted with its comparative rarity among Hindus and its still greater rarity among Mohammedans. The marriage of cousins is almost a rule among Parsis, and Shaw suggests that "it may be that the continuous marriage of cousins in some way lessens the power of resistance to the stresses of life, to produce the lack of vitality, to use Mott's phraseology, and

the disorders of metabolism that are the exciting factors in the breakdown." He believes that dementia præcox is the link between "mental deficiency" and "mental disease", which have been separated for legislative and sociological convenience. He quotes Myerson's statement to the effect that most authorities are firmly convinced that there is a familial transference of certain types of feeblemindedness, and a growing belief that these familial cases originate in injury to the germ-plasm, and asks if it is not possible that similar germ-plasms or organisms of like unit character may be in some way mutually injurious. Investigation of heredity is difficult, especially in mixed populations, but a clear-cut group like the Parsi community in Bombay provides a promising field for study. Such a study could be effected only by a Parsi, as the race is jealously secretive about any matter pertaining to the "family".

W. H. HATTIE

Inheritance of Epilepsy. Epilepsy a Mental Hygiene Problem. Gordon, A., *Med. J. & Rec.*, 1930, **131**: 625.

Before one can talk intelligently upon the subject of inheritance in epilepsy one must realize that there are many types and causes for this disease, and all cases which have an obvious etiology other than heredity must be excluded. Thus, Gordon, in attempting to evaluate the influence of heredity in this condition, excluded all cases of epilepsy which gave any evidence of traumatic origin, all cases which were suffering or had suffered from any organic disease of the nervous system, all cases which gave a history of injury at birth, all cases suffering from lues, alcoholism or inorganic intoxications, and finally all those cases in which there was a history in the family of any psychoneuroses or neuropathic taint other than the epilepsy which he found. Thus, he was dealing with a stock in which, excluding the epilepsy, there was no evidence of an unbalanced nervous system. He reports three families whose history he gives in detail, and in which there can be no doubt as to the fact that epilepsy was inherited.

The first family extended through four generations, had 18 persons, with 9 epileptics. The progenitor of this family was a hale and hearty butcher who died at 82, but who had been subject to epileptic fits since his youth. He had two sons, both of whom developed their father's disease at about the age of puberty. One who believed in the efficacy of inheritance did not marry, the other who was a scoffer at such ideas, married, had four children, two of whom were normal, and two epileptics, both developing the disease at puberty. One epileptic son and one normal son did not marry. The epileptic daughter eloped and produced six sons, four of whom had remained normal, two of whom had become epileptics at the ages of 19 and 17. The normal son in the third generation who married had three normal sons and two epileptic daughters, one showing the onset of the trouble at 11, the other at 12. The second family was one which started with the marriage of two epileptics. Of their two daughters, one remained normal, the other became affected at the age of 12. The normal daughter had a normal son, and an affected daughter, who in turn had one normal and three epileptic daughters. The affected daughter of the second generation had two affected sons and two normal daughters. One of the sons had one affected daughter, the other had two affected sons. One of the normal daughters had three affected daughters. Thus, in four generations there were 20 persons, of whom 15, or 75 per cent were affected. In the third family of three generations, there were 16 persons, with 9 affected. An epileptic man had six children; the first, an affected daughter who had an affected son and two normal daughters; the second a normal girl; the third a normal girl who had two epileptic children; the fourth, an affected son; the fifth an affected daughter with three children so far normal; and the sixth an epileptic son with one son also affected.

In all these families, if the epilepsy began well after puberty, the intelligence and emotional stability of the patient remained good, but in the later generations the tendency was for the disease to appear at an earlier age and to be accompanied by mental deterioration and emotional instability. The author concludes, with entire justification, that there can be no doubt as to the inheritance of epilepsy in these cases. That the rule of transmission is not always simple is shown by the fact that in the three families the disease was passed on four times by persons who themselves never developed it. In only one instance had an affected person married and produced apparently all normal children. On the other hand, that does not give any warrant that they will not develop it, or will not pass it on to their children, even if they remain free from it themselves, so that such an instance cannot be used to support the idea that the disease tends to die out. The author comes to the only conclusion possible under the circumstances, namely, that no one in such a family in which there is a history of idiopathic epilepsy, be he affected or normal, is justified in marrying.

MADGE THURLOW MACKLIN

HYGIENE AND PUBLIC HEALTH

The Incidence of "Jake" Paralysis in Oklahoma. Bowden, D. T., Turley, L. A., and Shoemaker, H. A., *Am. J. Pub. Health*, 1930, **20**: 1179.

The authors give no definition of "jake", but it is assumed from the context to be extract of ginger, which is seemingly the solace of many in several of the American states when the strain of legal aridity becomes unbearable. In the early months of 1930 a large number of cases of paralysis of peculiar type were reported from various places in nine or more states. The

authors estimate that sufferers in Oklahoma numbered between 1,500 and 2,000, and the paper tells of their investigations and findings.

Fluid extract of ginger came under suspicion early, after a belief that the condition was a low grade infection had been abandoned. The authors, after consideration, rejected a variety of theories of causation, such as poisoning by lead or some other heavy metal, a fungus growth on the ginger, the substitution of a root resembling ginger but containing a toxic alkaloid, and redistillation of the extract which rendered the product toxic. An adulterant was sought for. Iso-propyl alcohol was found in several samples, but the findings of other investigators convinced the authors that this was not responsible for the symptoms. Two cases came to autopsy, and the staining reactions of nervous tissues were similar in both cases. One of the authors then learned that a substance thought to be tricresyl-phosphate had been found in a series of samples of ginger extract. By a modification of Fuller's procedure, the authors convinced themselves that this substance was present in samples available to them. Technical tricresyl-phosphate was then administered to full-grown chickens and dogs. The dog experiments rather went "agee", but the results were suggestive. The chickens developed paralysis and respiratory embarrassment, and died. In another series of experiments, ginger free from tricresyl-phosphate produced nothing more than a temporary exhilaration, while ginger containing that substance caused paralysis and even death, the severity of the symptoms being determined largely by the proportions in which tricresyl-phosphate entered into the preparation. Microscopical examination of the nervous tissues of these animals did not show the fatty degeneration which was noted in the human cases, but did show karyolysis, karyorhexis and degeneration of cell bodies, which characterize intoxication resulting from tricresyl-phosphate.

W. H. HATTIE

RADIOLOGY

Intravenous Pyelography. Von Lictenburg, A., *Radiology*, 1930, **15**: 664.

The article reviews the various steps which finally led to the use of iodine combinations in pyelography, using the intravenous method of administration. He states that the use of uroselectan in intravenous pyelography is of threefold value: (a) It affords visualization of the urinary tract with special reference to its system pathology and physiology. (b) It affords, through pictorial nuances and qualitative and quantitative chemical analyses, knowledge of renal function. (c) It affords an insight into the dynamics of the urinary tract by permitting the examiner to observe the expulsion of the medium through the tract.

The concentration of iodine in the blood is charted and this is of clinical value because the fixing of the four-hour residue in the blood can be utilized as a rough retention test. Where normal kidney function exists, no uroselectan is found in the blood after four hours. Physiological experiments by Hughes and Schoffhauser are quoted to show that the uroselectan is secreted by the glomeruli of the kidney. "Damaged glomeruli give bad or no shadows at all, especially in cases with purulent infection of the parenchyma, many forms of tuberculosis and tumours. On the other hand, clean obstruction, in tubular destruction, even in far advanced stage will give good shadows." "Neither the coagulation time of the blood nor the rapidity of sedimentation is altered by the injection of uroselectan, therefore it does not appear that any special danger of thrombosis or embolism may arise following its injection." Out of 1,500 cases that came under his observation only eight developed small thrombi at the point of injection, instances which can, without doubt, be attributed to local injury to the intima.

From the standpoint of the clinician, intravenous pyelography is indicated: (1) in those cases in which cystoscopy or ureteral catheterization cannot be performed because of anatomical, pathological or technical reasons; (2) in all cases of ureteral obstruction where the contrast medium by means of instrumental pyelography does not pass the obstruction; (3) in those cases in which instrumental pyelography cannot be undertaken without risk to the patient. To this group, belong patients whom one wishes to spare the pain of catheterization and of whose condition one can obtain sufficient information through intravenous pyelography.

A. STANLEY KIRKLAND

Spondylitis Traumatica Tarda (Kummell's Disease). Blaine, E. S., *Radiology*, 1930, **15**: 551.

Kummell first described this condition in 1891 and again in 1921; he reviewed the subject *in extenso*. At that time, he called the lesion "post-traumatic disease of a vertebra". The disease follows an injury involving the spine. Usually the injury is slight, so much so that medical attention is frequently not obtained. Weeks, months or even years later the gradual development of back pain, with or without change in the normal spinal curve, will call for x-ray investigation, which, at the late date, shows the characteristic picture of loss of height in a particular vertebra. The roughly rectangular outline of the normal vertebra is lost, being replaced by a vertebra in the shape of a truncated cone, owing to partial collapse or settling.

Kummell believes that no actual or true fracture occurs at the time of injury, but that there is a microscopic fracture involving the trophic factors, so that the bone becomes gradually devitalized and is therefore unable to stand the normal pressure of the body weight in normal upright postures. Many patients never know that they have suffered such an injury and permanent disability is rarely more than 10 to

15 per cent. George and Leonard differ with Kummell as to the absence of initial fracture, believing it to be a definite compression fracture which is not demonstrable or is overlooked on the x-ray film at the time of injury. The author agrees with this hypothesis. The principal lesion to be differentiated from Kummell's disease is spondylitis tuberculosa, which shows suppuration, necrosis, more absorption of bone tissue than in Kummell's disease, and is much more painful. In spondylosa rhizomelica there is a general settling of all the vertebral bodies. In post-typhoid spine, there is some loss of bone substance, but usually a hypertrophic change of repair takes place and covers the local decrease. In malignancy of the spine, there is local disappearance of bone substance but a shell-like outline of the body remains until it is collapsed by body weight.

A. STANLEY KIRKLAND

Obituaries

Dr. George Balmer, of Inglewood, Ont., died at the Toronto General Hospital on November 25, 1930, in his sixty-second year. He was the youngest son of Mr. and Mrs. George Balmer, of Inglewood. He graduated from the University of Toronto in 1898, and after post-graduate work in England took over the practice of Dr. George Badgerow, then at Adelaide and John Streets, Toronto. Dr. Balmer was a man of quiet studious habits, beloved by his many friends. A few years ago he left Toronto for his old home at Inglewood, Ont. He was unmarried. Among the surviving relatives are his three brothers, James, of West Toronto, John, of Scott, Sask., William and three sisters, of Inglewood.

Dr. William James Chapman, prominent in Toronto medical circles, died at the Western Hospital, Toronto, on November 30th after an illness of several months' duration. He was 66 years of age, and came to this country with his parents from Belfast, Ireland, at the age of 6. Educated in Toronto, he graduated from the University of Toronto, afterward practising medicine in Kenora for 28 years. In the early years of the war Dr. Chapman went overseas and joined the West Kent Regiment as Medical Officer, serving in Gallipoli, and at the termination of the war was given the rank of Major.

Instead of returning home, he remained in London for nearly two years, at the end of this time taking degrees as an eye specialist. He then went to Vienna, where he continued his work.

On his return to Toronto, and up to the time of his illness, he practised in the Physicians and Surgeons' Building, and was on the Toronto General Hospital staff. Surviving are two brothers, Edward G. Chapman, and Ben. M. Chapman, both of Toronto, and a sister, Mrs. R. Hanna, also of that city. His wife, Isabelle Craig Chapman, died two years ago.

Dr. Gordon Laurence Cockburn. After a brief illness, the death occurred at Sturgeon Falls, Ont., on November 5, 1930, of Dr. Gordon L. Cockburn, a well-known medical practitioner of that district. Born in Sturgeon Falls forty-five years ago, Dr. Cockburn, on receiving his degree, practised for a time at North Bay. In 1914 he enlisted for overseas service with the 97th Algonquin Rifles, and went overseas with the First Contingent. On his return to Canada, in 1918, he resumed his practice at Sturgeon Falls. Besides his mother, Mrs. C. Cockburn, of Sturgeon Falls, he is survived by five brothers and two sisters.

Dr. E. J. Free. Dr. E. J. Free, of Campbellford, Ont., died on November 16, 1930, at the age of seventy-one. He was a graduate of Victoria University (1887). Dr. Free is survived by two sons, Dr. F. deF. Free, of Campbellford, and John Free, of Smith's Falls. His wife predeceased him in October, 1929.

Dr. William Young Fullerton, a graduate of Bellevue Hospital Medical College, 1872, died at his home at Port Williams, Nova Scotia, on December 9th. Although well advanced in years he remained in active practice until within a few weeks of his death. He took a great interest in horticulture and in all things which concerned the life of his community, and was held in affectionate esteem by all classes.

Dr. John James Irven. The sudden death of Dr. John James Irven on December 6, 1930, came as a very great shock to the members of his family, his many friends, professional associates and patients. He was loved by all for his kindly disposition and bigness of heart, and was most highly respected by his patients and esteemed by his confrères for his devotion to duty and his rare judgment. Death came to him not only in the very prime of his busy, happy and successful life, but also in the actual performance of his work. He had only just returned from his work at the General Hospital, which he had carried through for the day in spite of premonitory symptoms of cardiac distress, when he collapsed and died within a very short while.

Dr. Irven was born in Alexandria, Ont., and graduated at McGill University in 1911. From then on he practised his profession of surgery in Montreal, after being medical superintendent of the Western Hospital for some time. He had rounded out his training with an interneship at the Montreal Maternity Hospital also. He later was appointed as associate surgeon on the staff of the Montreal General Hospital, where his skill and devotion to his work were highly prized. He was a member of the University Club, a charter member of the University Masonic Lodge, a member of the Scottish rite, and an honorary member of the Phi Rho Sigma fraternity.

The funeral ceremonies were conducted at his home by the Rev. Malcolm Campbell, and the body was then taken to Alexandria for interment. The large and representative number in attendance at the funeral spoke volumes for the esteem in which he was held. He leaves a widow and five children.

Dr. J. J. Gillespie, well known throughout the Pincher Creek district, Alberta, died suddenly on November 28th, 1930. He was a graduate of Queen's University (1903) and went to Alberta in 1905.

Dr. T. L. Gray. St. Thomas lost one of its most valuable citizens, and western Ontario medical circles one of its most useful and distinguished members, on November 13, 1930, in the death of Dr. Thomas Lamb Gray, after four weeks' illness from pneumonia.

Dr. Gray was not only a leader in his profession, but as a specialist in x-ray work he had achieved an international reputation, attending and speaking at many of the largest medical conventions in Canada and the

United States on the subject of roentgenology, and exhibiting numerous photographs made in his laboratory in St. Thomas. He was taken ill shortly after his return from the meeting of the British Medical Association in Winnipeg.

Dr. Gray was a son of the Rev. John Gray, of New Sarum, and was born near Clinton, Ontario, 58 years ago. He graduated from the medical school of the University of Western Ontario in 1897, practising first in New Sarum, then for a short time in Clinton, finally settling in St. Thomas thirty years ago. He is survived by his widow, formerly Alice Hill, of Boston, five brothers and one sister.

Doctor Gray was to have been one of the speakers at the sixteenth annual convention of the Radiological Society of North America, in Los Angeles, in December last, his subject being "The value of x-rays in diagnosis."

Dr. Joseph Green, of Toronto, died on October 17, 1930, at the early age of thirty-five. He was a graduate of Toronto University, of the class of 1925.

Dr. Henry Thomas Machell. Dr. H. T. Machell, of Toronto, died at his residence on November 9th, 1930, in his eighty-first year. He was a graduate in medicine of Toronto University (1873), and also had the diploma of L.R.C.P. of Edinburgh.

Dr. A. C. Mavety, of Erindale, Ont., passed away after a brief illness on November 4, 1930, at St. Joseph's Hospital, in his seventy-ninth year. Dr. Mavety, who had discontinued practice three years ago, was born at Loughboro. Of late he had been living with his daughter, Mrs. W. Cotton of Erindale, who together with another daughter, Mrs. Euen Van Kleek of Hartford, Conn., and his son, Dr. A. F. Mavety of Toronto, survives him.

Dr. W. S. McClinton, of Midland, Ont., was drowned in Georgian Bay on October 31st when returning from a fishing trip. It is believed that he fell overboard from a launch during a heavy sea.

Dr. McClinton, who was born in 1895, was well known in Toronto, where he spent his student days and had his early training in medical work. Early in 1915 he went overseas with the 37th Battalion, which he joined at the time of its organization. Later he transferred to the 18th Battalion, with whom he saw active service, went through the Somme, and won the Military Cross. He was popular with all ranks and made a name for himself as a brave soldier and officer. Early in 1917 he was returned to Canada to finish his medical course in order that he might fill a necessary post in the Medical Corps. However, the war ended before he secured his medical degree from Toronto University in 1919. After graduation he took up post-graduate courses in several European centres.

Dr. John McLean. After a lingering illness, Dr. John McLean, Orillia's medical officer of health up till a few weeks ago, and one of the town's oldest and best known citizens, died at his home on December 4th, at the age of 83.

Dr. McLean was an outstanding figure in municipal and political life in the town for more than half a century and his death severs another link with the one time village of Orillia and the present town. He was for many years one of the mainstays of the Liberal party in East Simcoe.

Dr. Patrick Joseph Murray, On December 10, 1930, the death occurred in St. Michael's Hospital, Toronto, of Dr. Patrick Murray. Dr. Murray was taken ill the previous Saturday and his death came as a shock to his many friends in the community.

Dr. Murray was born in Cayuga, Ontario. In 1927 he graduated from the University of Toronto in the faculty of medicine, after which he served as an interne in St. Michael's Hospital, for two years. He recently started practice for himself in Toronto.

Dr. Murray is survived by his parents, Mr. and Mrs. Edward Murray, and three sisters, all residing in Cayuga.

Dr. S. T. Rutherford. Dr. S. T. Rutherford, of Stratford, Ont., died from a heart attack on November 29, 1930. He was for forty years one of the best known physicians in his district. Born in Monkton sixty-seven years ago, he received his early education in that village, later graduating from Victoria University in 1889. Fifteen of the forty years he had spent in the medical profession were spent in Listowel. He came to Stratford thirty-five years ago and for the past ten years had been in partnership with Dr. Maxwell Fraser. In politics Dr. Rutherford was a staunch Conservative and he had occupied positions on the executive of the Stratford association for a number of years. He was a member of the board of management of Knox Presbyterian Church, and at the time of his death was serving as jail physician for the county.

Surviving are his widow, one brother, James Rutherford, of Millbank, and two sisters, Mrs. A. Riddell, of Palmerston, and Mrs. Frank Martin, of Guelph.

Dr. Allan Montgomery Ruttan. The death occurred at Provost, Alberta, on November 14, 1930, of Dr. Allan Montgomery Ruttan, who was the last member of a family ranking high in scientific work in Canada. He was seventy-four years of age and was born in Newburgh, Ontario. He was a brother of Dr. R. F. Ruttan, late professor of chemistry at McGill University, who died during the last year and was known to many thousands of McGill graduates.

Dr. Allan Ruttan practised in Quebec for some time after his graduation from McGill University, then went to New York where he spent about twenty years as a chemist. Early in the present century he moved to Lloydminster, Saskatchewan. In 1905 he settled at Provost, Alberta. He is survived by a widow and one stepson, William. He was of Huguenot extraction, members of his family having emigrated from Rochelle, France, in 1794 and settled in New Rochelle, New York. This town was purchased in 1689 expressly for a Huguenot settlement by Jacob Leisler, Commissioner of the Admiralty under Governor Dangan, of the province of New York. Another member of the family, Lieutenant Henry Ruttan, saw service with the British in 1812, and was prominent at the battle of Lundy's Lane. In the year 1836 he was elected to the House of Assembly and during the parliament of 1838 was unanimously elected Speaker of the House.

G. E. LEARMONTH

"I feel not in me those sordid and unchristian desires of my profession: I do not secretly implore and wish for Plagues, rejoice at Famines, revolve Ephemerides and Almanacks in expectation of malignant Aspects, fatal Conjunctions, and Eclipses . I rejoice not at unwholesome Springs, nor unseasonable Winters: my Prayer goes with the Husbandman's: I desire everything in its proper season, that neither men nor the times be put out of temper. Let me be sick myself, if sometimes the malady of my patient be not a disease unto me. I desire rather to cure his infirmities than my own necessities. Where I do him no good, methinks it is scarce honest gain: though I confess 'tis but the worthy salary of our well-intended endeavours. I am not only ashamed, but heartily sorry, that, besides death, there are diseaess incurable: yet not for my own sake, or that they be beyond my art, but for the general cause and sake of humanity, whose common cause I apprehend as my own.—*Religio Medici.*

News Items

BRITISH EMPIRE

Royal College of Physicians and Surgeons of Canada

On November 26, 1930, the first annual meeting of the Royal College of Physicians and Surgeons of Canada was held at the Chateau Laurier Hotel, Ottawa, with forty-four Fellows answering to the roll call.

The morning and afternoon sessions were given over to the deliberations of Council, the following members being present: Drs. J .C. Meakins, Montreal, (*President*); Duncan Graham, Toronto; F. N. G. Starr, Toronto; A. T. Bazin, Montreal; L. deL. Harwood, Montreal; J. E. Dubé, Montreal; N. J. Maclean, Winnipeg; W. T. Connell, Kingston; L. J. Austin, Kingston; George Hale, London; Hadley Williams, London; E. L. Pope, Edmonton; A. R. Munroe, Edmonton; C. Dagneau, Quebec; T. C. Routley, Toronto.

The following matters were dealt with:—

FINANCIAL STATEMENT

During the first year of operation, the College has had a gross income of $16,311.37, with total expenditures of $2,426.53, leaving a credit balance of 13,884.84.

BY-LAWS

Hours were consumed by the Council in completing the By-Laws of the College. Having regard to the fact that the foundations now being laid must be the guide for the College in the years that follow, a great deal of attention was given to the questions of credentials, diplomas, examinations, election of councillors and officers, type of register to be kept, declaration to be signed, code of ethics, and general conduct of the College.

ELECTION OF FELLOWS

The next important order of business was the consideration of a large number of names of those desiring Fellowship in the College. Fifty-three were ultimately approved for Fellowship.

EXAMINATIONS

With regard to examinations, Council decided that the first primary examination should be held in the autumn of 1931. To this end, a sub-committee was instructed to lay plans.

ANNUAL DINNER

The annual dinner took place at 7:30 p.m., with the following Fellows in attendance: Drs. Gustave Archambault, Montreal; L. J. Austin, Kingston; W. L. Barlow, Montreal; A. T. Bazin, Montreal; H. A. Beatty, Toronto; E. P. Benoit, Montreal; I. G. Bogart, Kingston; B. G. Bourgeois, Montreal; W. T. Connell, Kingston; H. B. Cushing, Montreal; C. Dagneau, Quebec; J. E. Dubé, Montreal; E. M. Eberts, Montreal; C. B. Farrar, Toronto; J. U. Gariepy, Montreal; A. H. Gordon, Montreal; Duncan Graham, Toronto; J .A. Gunn, Winnipeg; G. C. Hale, London; L. deL. Harwood, Montreal; C. P. Howard, Montreal; H. A. Lafleur, Montreal; Albert Lasalle, Montreal; M. H. Lebel, Montreal; A. Léger, Montreal; Albert Lesage, Montreal; N. J. Maclean, Winnipeg; J. D. McQueen, Winnipeg; E. H. Mason, Montreal; J. C. Meakins, Montreal; A. R. Munroe, Edmonton; J. A. Nutter, Montreal; Frank S. Patch, Montreal; C. A. Peters, Montreal; E. L. Pope, Edmonton; Alex. Primrose, Toronto; I. M. Rabinowitch, Montreal; T. C. Routley, Toronto; C. K. Russel, Montreal; Eugène St. Jacques, Montreal; W. Harvey Smith, Winnipeg; J. F. Sparks, Kingston; F. N. G. Starr, Toronto; Hadley Williams, London.

After the dinner, the President, Dr. J. C. Meakins, of Montreal, in presenting his Presidential Address, made particular reference to the efforts which the Council had exerted to lay the organization of the College according to the provisions of the Act. They had paid particular attention to the interpretation of Sections 2, 5, and 6, which covered the admission of Charter Fellows. He pointed out that the Council had been actuated by the desire to fulfil the provisions of the Act, not only in principle but also in the spirit of those who sponsored its foundation. He also made reference to the draft copy of the Constitution and By-Laws which were placed before the Fellows for their consideration and dealt with certain details of organization, such as diplomas, seal, cap and gowns, and the preliminary arrangements for the examinations.

The balance of the evening was given over to a discussion of the Constitution and By-Laws and the general principles upon which the Council is founded.

13th Annual Meeting of the Canadian National Committee for Mental Hygiene

The Canadian National Committee for Mental Hygiene held its thirteenth annual meeting in Toronto, from November 20th to 29th, at the headquarters, 111 St. George Street.

About one hundred delegates from all the provinces were present. These delegates represented child and adult welfare organizations, juvenile courts, departments of universities, hospitals, mental hygiene and psychiatric clinics, public health workers,—all actively engaged in some phase of mental hygiene effort throughout Canada.

The proceedings of the meetings and the various papers and reports presented indicate: (1) the great variety and scope of the fields in which mental hygiene is being applied and integrated; (2) the steady growth of public interest in the practical help mental hygiene can give toward securing for individuals, happier, healthier human relationships and effort; (3) the solid accomplishments of the past few years, by provisions for the improvement of the care and treatment of the mentally ill, programs directed toward prevention of mental disease and maladjustment, and research, directed to better understanding of human thought and behaviour and methods of ensuring mental health.

Because of the time and difficulties involved in re-educating adults who are mentally ill or maladjusted, the greatest and most productive mental hygiene effort must be directed toward infancy and childhood—toward providing for the developing individual the kind of environment, training and understanding that will conserve mental health.

To sucecssfully carry on such productive effort requires trained personnel—teachers, parents, nurses, physicians, who are familiar with the principles of mental hygiene and are emotionally mature enough to put these principles into effect in their daily contacts with the child. Throughout the meeting an appreciation of this need was evident and the reports indicated at the present time, through university departments of Education, Psychology and Medicine, through revisions of the curricula for nurses and social workers, through organized programs of Parental Education, by means of study groups, that emphasis is being placed upon so equipping and educating these key people that they shall be able to consistently and successfully promote and maintain the child's mental health.

Among the interesting changes in personnel is the appointment of Prof. A. Grant Fleming, Director of the Department of Public Health and Preventive Medicine, of McGill University, as Director of the Canadian National Committee for Mental Hygiene, in cooperation with Dr. C. M. Hincks, who, while maintaining medical direction of the Canadian organization, has assumed responsibility for the medical direction of the American National Committee for Mental Hygiene. Dr. H. B. Spalding has been appointed Director of the Division of Legislation and Statistics.

Medical Posts in the North

Dr. L. D. Livingstone, Chief Medical Health Officer for the North West Territories and Yukon Branch of the Department of the Interior, recently returned from the north on board the patrol ship, *Beothic*. Dr. Livingstone boarded the ship at Chesterfield where he had been since the beginning of the year establishing a medical post for the benefit of the natives and white men of the region. He was succeeded by Dr. D. S. Bruce, who will remain at this point for the next two years.

The immense value of the medical posts maintained in the north by the Department of the Interior is illustrated by the number of cases attended by Dr. Livingstone during his four months at Chesterfield. Dr. Livingstone left Ottawa for the Hudson Bay point early in the year and travelled by rail to Churchill, making the latter part of his journey from The Pas to the terminus of the Hudson Bay railway in twenty-seven hours. He reached Churchill on April 12th and was held at that point by extremely cold weather and a gale until the 20th when he began the 450-mile journey by dog-team northward along the west coast of Hudson Bay.

During this trip Dr. Livingstone visited native settlements at Nunulla, at a point some distance inland on the Tha-anne river, at Eskimo Point, at Mistake Bay, and at Tavane. In all about twenty-five families were visited, representing about 100 natives. This is about one-third of the estimated Eskimo population of the coast, the majority of the natives having not returned from their inland camps. At Chesterfield the native population numbers about 150, while the number of white men seldom exceeds twelve or fifteen. These latter include Government officials such as the wireless operators, the Royal Canadian Mounted Police detachment, and the medical officer; those in charge of the trading posts; the missionaries; and transient mining men.

Immediately upon his arrival Dr. Livingstone proceeded with the work on his dwelling and surgery, the construction of which had been begun the previous autumn. It was completed before he left Chesterfield early in September. A severe epidemic of influenza, which broke out shortly after the arrival of the first ship, spread along the Hudson Bay coast from as far south as Churchill to as far north as Southampton island. Fortunately the outbreak reached its peak at Chesterfield during the fine weather in July and that period of warm, dry days was an important factor in the low death rate. Reports received by Dr. Livingstone up until the time of his departure showed that ten natives had died. Two of these deaths occurred in Chesterfield while the others were reported from Mistake Bay, Eskimo Point, Baker Lake, and Southampton island.

Apart from the influenza outbreak the health of the natives was comparatively good. A number of minor surgical cases were attended and other treatment given. For the first time during his long service in the north Dr. Livingstone was able to have blood specimens transported south for tests. The two seaplanes of the Royal Canadian Air Force which had been engaged in aerial photographic work in the north this summer landed at Chesterfield on September 7th while Dr. Livingstone was preparing for the arrival of the patrol ship *Beothic*. Flight-Lieutenant F. J. Mawdesley, in charge of the aerial party, undertook to transport the blood specimens to Winnipeg. This had never before been possible, as the time required to bring such specimens south was too great and their usefulness for the purpose for which they were required was lost.

The fur catch of the natives along the western coast of Hudson Bay was good during the past winter and living conditions were consequently satisfactory. Work on the new hospital being erected by the Roman Catholic mission at Chesterfield was well advanced during this season and with the arrival of the interior fittings next spring the hospital will be ready for occupation in the summer of 1931.—*Natural Resources, Canada.*

Reciprocal Registration with Australia and Canada

The several States of Australia, and the several Provinces of Canada, may by Order in Council enter into relations of reciprocity with this country separately. But no such Order in Council has been made applying the Medical Act, 1886, to the Commonwealth as a whole, or to the Dominion as a whole. If at any time Australia or Canada should choose to establish a Central Board and a single standard of qualification, reciprocally recognized by the several States or Provinces, and valid over the whole territory, it would remove certain disabilities and difficulties encountered now by their own medical graduates, and simplify the procedure of recognition and registration in this country. It would then rest with His Majesty in Council, if so advised, to apply Part II. of the Medical Act, 1886, to the Commonwealth or to the Dominion, as it is now applied to British India. As the method and the results of establishing reciprocity between the parts of the Empire are somewhat complex, and owing to circumstances diverse in different cases, I have, at the request of the Privy Council, had a memorandum drawn up by the Registrar, setting forth the particulars of the existing law. This has been received by the Executive Committee and approved for circulation.—Sir Donald MacAlister, President of the General Medical Council, in *The Lancet*, 1930, **2**: 1198.

A Trap for the Tsetse Fly

Mr. Harris, a Government entomologist who for some years past has been stationed in the Zululand Game Reserve investigating methods for the control of *nagana*, the tsetse-borne cattle disease, gave a demonstration at Hluhlue Game Reserve last week before the Provincial authorities and leading entomologists of the Union of South Africa and Rhodesia of his recently devised tsetse trap.

Mr. Harris some time ago satisfied himself that the tsetse fly hunted entirely by sight. He found it was attracted to roughly shaped dummy animals, that it usually attached itself to the belly, and that it reacted to contrasts of light and shade. The trap consists of a wooden frame on legs, covered with hessian, except at the bottom, and having a gauze trap at the top, and is shaped sufficiently like a living animal to attract the fly. Swooping towards the lower part of the trap, the fly comes within the hessian walls, and attracted by the light showing through the gauze above, enters the trap proper. For the demonstration 18 traps were set up, and at the end of the day they were found to contain 1,393 flies, of which 942 were females. A most effective demonstration was the release of a number of flies taken from the trap, practically all of which again found their way into it. Experts are so far guarded in their comments, but, since the fly is not a prolific breeder, it is considered that if an adequate number of traps were used they would make a marked difference to the fly population of Zululand. The traps cost about 30s. each, require but little supervision, and it is estimated that they would remain in good order for a period of eighteen months.—*Weekly Times*, November 20, 1930.

Devadasis

While many of the Indian States are conservative in comparison with British India, not only in political but social reforms, some of their rulers, particularly those who have been educated on Western lines, have shown great initiative and a lofty spirit of idealism. The late Begum of Bhopal exercised, in many ways, a beneficent influence in her State. The Maharajah of Gondal (an Edinburgh medical graduate) is noted for his interest in education and public works. Now the Maharanee Regent of Travancore has taken action in a matter which has so far defeated all the efforts of reformers in British India. During a recent tour in her State, the Maharanee happened to visit a temple for worship. On finding that dancing girls were kept there, she issued an order abolishing the practice, and suggesting that in future men should be employed to perform the ceremonial duties.

GREAT BRITAIN

Royal College of Surgeons of England

An ordinary meeting of the Council was held on November 13th, with Lord Moynihan, the President, in the chair. Dr. Frederick Grant Banting, M.C., M.R.C.S., Professor of Medical Research in the University of Toronto, was elected an Honorary Fellow of the College. Dr. Banting is the first Member to receive this distinction.

In regard to this the London *Times*, of November 14, 1930, has this to say.

"Yesterday afternoon the Council of the Royal College of Surgeons of England conferred the Honorary Fellowship of the College on Dr. Banting, of Toronto. The honour, the highest which the Council can offer, is signal; no other member of the College (Dr. Banting is already M.R.C.S.) has ever before received it. But the discoverer of insulin certainly deserved no less at the hands of British surgeons. His work, as Lord Moynihan pointed out, has a direct bearing on the practice of surgery; it was made possible in the first instance by the achievements of Lister. In its essence it is an application of physiological knowledge to the needs of clinical practice, and therefore represents that synthesis of effort which is the foundation of the science of medicine. Lord Moynihan, who has just returned from Canada referred to the lustre which Dr. Banting's work has shed on medical research in that land. The discovery of an effective treatment of diabetes is certainly the most important contribution to therapeutics which has so far been made by any of the British Dominions. It stands, and will stand, as an inspiration and an example to the hundreds of eager young workers, who, in Canada, in Australia, in New Zealand, in South Africa, and in other parts of the Empire, are dedicating their lives to the prevention and cure of disease."

The Eastman Dental Clinic

The Eastman Dental Clinic of the Royal Free Hospital opened on November 19th.

The clinic, London's most modern and complete establishment of its kind, was built, equipped and endowed by George Eastman of Rochester, N.Y., together with Lord Riddell, president of the Royal Free Hospital, and Sir Albert Levy, treasurer of the hospital.

Mr. Eastman's gift, exceeding $1,000,000, made the clinic possible. His generosity will make it possible for some 500,000 children living in the boroughs of Finsbury, Holborn, Islington and St. Pancras a chance to receive free treatment for dental, tonsil, adenoid, and similar ailments.

An official reception was held in connection with the formal opening at which United States Ambassador Charles G. Dawes attended. He lauded Eastman's many-sided nature and his "boundless generosity."

The Prince of Wales set the foundation stone for the Eastman Dental Clinic some eighteen months ago, on May 1, 1929. He used a silver and ivory maul, level and trowel during that ceremony and then dispatched them to Mr. Eastman.

The building is of an American type, granite and concrete. It has a central heating system.

Treatment will be provided free to children up to sixteen years of age. Aside from being a dental clinic, the hospital will offer treatments for eye, ear, nose and throat trouble. It also will have a department for the treatment of expectant mothers.

The dental department is furnished with 68 chairs and electric units. Fifty of these are placed in the central treatment room, 11 in the department of orthodontia, and 3 in the extracting room. Thirty-seven beds for tonsil, adenoid, hare-lip and other surgical cases are provided in one wing.

Mr. Eastman's gift to the Royal Free Hospital is similar to his endowments made to the Boston Institute of Technology and the School of Medicine and Dentistry at Rochester. He recently offered to make gifts for dental clinics in Paris and Stockholm, Sweden.

Royal College of Physicians of Edinburgh

At the annual meeting of the College held on Thursday, December 4th, the President, Sir Norman Walker, was in the chair.

Sir Norman Walker was re-elected *President* for the ensuing year. Drs. Robert A. Fleming, Robert Thin, Wm. Fordyce, Edwin Bramwell, Edwin Matthew and A. Fergus Hewat were elected *Members of Council*, and Dr. Robert Thin was nominated *Vice-President*.

At an extraordinary meeting held at the close of the annual meeting, Drs. John Orr and William Fordyce were elected Representatives on the Board of Management of the Royal Infirmary.

The College voted a sum of one thousand guineas to the Royal Infirmary, Edinburgh, in response to its Bicentenary Appeal.

A Case of Acromegaly

Dr. Leonard Portal Mark of Oxford-terrace, Hyde Park, W., who for 50 years had suffered from acromegaly (of the growth of which he had kept a medical record) died on September 5, 1930, aged 75. His will states:—"I desire that after my death my body shall be sent to St. Bartholomew's Hospital, and that an autopsy of it shall be made by the pathologist for the time being of the said hospital, to whom a fee of 10gns. shall be paid out of my estate; and that any bone or bones or part or parts of any bones of my skull and skeleton which the pathologist and the curator of the museum for the time being may consider interesting from a pathological point of view, with any tumour which may be found growing within my skull, shall be placed in the hospital museum in such a manner as they may think fit."

Apropos of this case Sir D'Arcy Power writes (*The Lancet*, 1930, **2**: 670.): "Few persons have described a disease from which they have themselves suffered. The outstanding instances are Montaigne and Pepys as laymen: Thomas Sydenham and Leonard Mark as doctors. Montaigne and Pepys only give details in-

cidentally and as they affected their general life. Sydenham and Mark made more careful studies and yet each in a wholly different manner. Sydenham in his 'Tractatus de Podagra' used his own experience as a basis for a description which soon became classical and, as gout has now become rare, is unsurpassable. But he went into no minute details and dealt rather in generalities, using his personal knowledge to illustrate the thesis. Leonard Mark, on the other hand, in his book on 'Acromegaly' published in 1912 and in the 'Apologia' which appeared 15 years later, aimed at giving a minute and complete account of the disease as it occurred in a single case—*viz.*, in himself. He traces it from the insidious beginning, and by means of photographs shows the physical changes which it caused in his own person. Pursuing his object he records the changes which took place in his eyes, in his skull, and in his brain, obtaining written opinions from those amongst his many friends who were masters in their own branches of knowledge. Finally, to complete the record he left directions that his skull and brain should be examined after death by a competent pathologist. Not content with a study of the physical side he placed on record the mental states involved which he alone could treat adequately—the headaches, the lethargy, the subjective noises and the varying feelings of depression. Yet all is done in a scientific spirit and without undue introspection or any self-pity and in this lies the value of the record. A notable example of the *mens sana in corpore insano*, and so an exception to the general rule. Whether it were worth while to have done it is another matter. Occasionally 'yes,' when the patient can take so detached a view of his malady, but an example not to be copied too frequently, especially in this age of sentiment.''

The New Lord Mayor of Leeds

The new Lord Mayor of Leeds is a medical man, Dr. Arthur Hawkyard. At the forty-seventh annual dinner of the students of the old Leeds Medical School, held on November 13th, last, Dr. Hawkyard, whose election as lord mayor met with general approval in the city and in the medical profession, remarked that he had been present at the first dinner, and that he had hardly missed any of the gatherings since. He added that he was not the first medical man to occupy the mayoral chair, as had been stated; he was indeed the first *Lord* Mayor, but in the year 1787 the great William Hey occupied what was then the mayoral chair. Other members of the profession had occupied a similar position, but there had been a long interval, for his immediate professional predecessor was Dr. James W. Wilson, ninety-four years earlier.

ALBERTA

The following is a list of those who have recently registered with the College of Physicians and Surgeons of Alberta: A. J. Fisher, Calgary; H. B. Hunt, Carmangay; W. L. Valens, Ponoka; G. L. Davison, Calgary; E. P. Scarlett, Calgary; J. K. Fife, Edmonton; M. Hankin, Thorsby; G. C. Ferguson, Bishop's Mills; F. H. Wheeler, Saskatoon; A. W. White, Schumacher; G. G. Brearley, Edmonton; L. M. Mullen, Calgary; K. A. Hamilton, Edmonton.

According to Mr. W. G. Hunt, Associate Secretary of the Alberta Medical Association, so successful was the extra-mural post-graduate tour of Drs. L. H. McKim and C. O. Birchard, of Montreal, that over 60 per cent of the profession in Alberta were in attendance at the eleven towns visited. Thirty-eight lectures were given. Some of the meetings lasted until midnight. In many instances physicians drove from fifty to one hundred miles to attend.

The Association of Rural Municipalities held its annual meeting in Calgary, the latter part of November. One of the important questions discussed was the burden that has been placed on the municipalities by the Provincial Act in force, which states that a person becomes a resident after three months' residence in a municipality. A resolution was carried urging the provincial government to assume a greater and more responsible share in the care and treatment of indigents. It was also decided to ask for power to collect poll taxes from all residents who were not tax-payers.

It has been suggested that the Calgary Municipal Hospitals be supported entirely by taxation, property or poll tax; where the person is not a property owner, these paying the rates to be admitted free of all charges. Owing to the financial depression existing at present this idea will obtain in some measure sympathetic support. This proposal has been suggested from time to time in this city, but has not met with general approval.

There has been a steadily increasing number of accidents due to careless driving of automobiles in Calgary. It is felt that provision should be made whereby drivers shall be compelled to carry accident insurance to meet the dangers to human life resulting from their recklessness.

The Registrar of the College of Physicians and Surgeons states that the election of three members for the Council will take place in December. Two already have been elected by acclamation, namely, Dr. H. W. McGill, M.C., Calgary, and Dr. W. S. Galbraith, Lethbridge.

An interesting lecture was given by Dr. J. E. Palmer to the members of the Calgary Medical Society on December 2nd, on the subject of ''Some unusual kidney cases''. Numerous radiograms and pyelograms were shown illustrating the various lesions.

It is expected that the new Peace River hospital will be ready for occupation during the month of December. The building is of stucco and will accommodate fourteen patients. The old hospital will be used as an annex. The Peace River hospital and the hospital at Consort were the only two which have been built in the province during 1930. The total number of municipal hospitals throughout the province is now twenty-two. By the end of the year records will show that more than thirteen thousand patients will have been treated during 1930. There has been a yearly increase in the patient population. In the current year, additional territory has been added to the hospital districts of Grande Prairie, Innisfail, and Hanna.

In a recent letter to the Secretary-treasurer of the various school districts in the province, Dr. M. R. Bow, Deputy Minister of Health, made the following statement, ''The Registrar of the College of Physicians and Surgeons has brought to the attention of the Department an offer which has been made by the medical profession of Alberta, to give the rural school children a health examination along similar lines to that provided for in the cities of the province, that is, one inspection to be given per year the fees to be as follows: five

dollars per school plus one dollar per mile for mileage on the basis of ten pupils or fewer; over that number, an additional fee of fifty cents per pupil; if two schools are to be inspected on the one day, the mileage rate to be divided between the two schools, the trustees of any school district to be privileged to make the arrangement with any doctor they may choose.

"There has recently been evidence of a very general interest in the question of medical examination of school children, and a general desire that some arrangement be worked out, so that the rural children of the province might enjoy the same advantages as are now enjoyed by the urban children in connection with annual health examinations. Under the provisions of the School Act, as amended at the last session of the Legislature, School Boards are now permitted to make arrangements for medical examinations of school children. The College of Physicians and Surgeons has asked that this Department bring to the attention of school districts of the province the basis on which physicians will be ready and willing to co-operate with School Boards in rendering this service."

The Conjoint Meetings of the Alberta Hospital Association and of the Alberta Association of Registered Nurses took place in Calgary on November 13 and 14, 1930, and were largely attended. Round-table discussions were in charge of Dr. Harvey Agnew, Secretary of the Department of Hospital Services, Canadian Medical Association and Dr. Malcolm T. MacEachern, Director of Hospital Activities of the American College of Surgeons. To those who were privileged to attend these meetings, it was a source of delight to listen to these widely known physicians, and to learn how they dealt with knotty hospital and nursing problems in such an able manner.

Among the subjects dealt with at the round-table discussions were a home for disabled, bedridden and helpless incurables; the indigent problem; how shall the hospital carry on a twenty-four hour service for the admission of patients?; the co-ordination of hospitals regarding the admission of patients; farm workers and the Workmen's Compensation Act; increased grants for general as well as isolation hospitals; should a charge be made for babies in maternity wards?; how long should x-ray files be stored?; standardized hospital rates and what they should cover; compulsory automobile insurance, or, in its absence, should hospitals receive a percentage of auto licenses?; what method of financing hospitals would be based on sounder economic principles than those now employed?; government aid to schools of nursing; how shall the new-born baby be cared for immediately after birth to minimize the danger of an attack of pemphigus?; what process of treatment has proved most efficient in treating pemphigus in babies?

Dr. Harvey Agnew gave an address on "The medical profession and the hospital," while Dr. W. T. McEachern, of Chicago, spoke about "What hospitals are doing to keep costs within reach of the moderate wage earner."

At a luncheon at the Calgary Board of Trade Dr. M. T. McEachern gave an interesting address on "Hospital costs and charges versus the value of medical service." He stated that one of the biggest disappointments to him was that there has not yet been a new general hospital erected in Calgary, and that, in his opinion, there was nothing which this city needed so badly as a new modern hospital, and he appealed to the city to put over a bond issue for an institution worthy of the city. He spoke about the increasing value of modern hospitals and their equipment, and gave an interesting view of the costs and charges as relative to the better service now given, though charges for the care of patients in hospitals were considerably more than fifteen years ago. Those charges had not increased in proportion to the increase of the cost of maintaining and equipping a hospital as it should be equipped in modern times. One of the causes for the increased cost was the standard of living in the world to-day. A second factor was scientific advancement in medical and surgical services. The many new scientific appliances cost much money to operate and there was a general improvement in the general hospital of to-day as compared with the past. People are living longer to-day and the hospitals are responsible for that longevity. The average age of men had now advanced from forty-eight to fifty-four, and people are more quickly cured, owing to modern scientific methods. This tended towards a decreased stay in the hospital, the average stay being one of twelve to fourteen days, whereas formerly it was thirty to forty days. The time had been cut in two owing to better scientific nursing and medical service. The death rate had been lowered and the chances of saving life had therefore increased by 100 per cent. Owing to the shorter stays of the patients in hospitals and to the quicker recovery, charges were more for the shorter period. They were saved the difference by that shortening. Certain diseases, such as diabetes and pernicious anæmia, were now well controlled, and the patients recovered, whereas they formerly would have died. Many complaints are heard about the high charges made by hospitals. The reason is that the people as a whole do not know enough about them, and the doctors themselves have not been given sufficient information; besides, many magazine articles give distorted facts. Few people make a budget to meet illness, one of the reasons being that they spend too much money on luxuries. During the past year Canada spent six hundred million dollars on luxuries alone, sufficient to run all the hospitals in Canada for twelve years! Dr. MacEachern quoted the amounts spent on beverages, tobacco, amusements, automobiles, candy and chewing gum which were stupendous. He stated that this was one of the reasons why Canadians were not building up a hospital budget. He advocated greater consolidation of hospitals in order to save overhead expenses, as there were too many hospitals in some cities. He pointed out that every effort was being made in Alberta to carry on this reform, and complimented the Provincial Department of Health on the activity it displayed in this regard. "We must have better control of hospitals," he said, and pointed out that in Australia no hospital could be built without the sanction of a body which was non-political.

In regard to automobile accidents, Dr. McEachern remarked that 50 per cent of such accidents handled by the hospitals were never paid for. Accidents are on the increase, owing to the fact that many people who drive cars cannot handle them rightly. About 70 per cent of hospital bills were collected from the automobile owner who had insurance covering these accidents, and only 30 per cent from those who were not covered by it.

Another question which was being studied at the present time was the training of nurses and the cost of their education. It had been questioned whether this should be borne or not by the government instead of the hospitals, in the same way as other education. If this were done it would mean a reduction in the patients' charges, for that was the only way the cost could be borne at present. Dr. MacEachern also referred to the question of health insurance and the advisability of periodical health examinations.

Among the resolutions passed at the meeting of the Alberta Municipal Hospitals Association, held at Calgary in November last was one which was unanimously endorsed by the members; that the responsibility of caring for indigent patients in municipalities rests with the Provincial Government and not with the municipalities; that the Provincial Government accept this responsibility either by way of increased grants, the setting aside of

liquor profits, or the institution of a general poll tax for indigent patients' maintenance.

Another resolution requested the Provincial Government to extend their laboratory service to include x-ray work. By this means x-ray prints taken at municipal hospitals could be sent to Edmonton for examination and diagnostic reports be given by a radiologist.

Owing to the fact that hospitals in the province are facing mounting deficits to such an extent that it is creating an intolerable burden, a resolution was passed at the Alberta Hospitals Association requesting the provincial government to increase the per diem per capita grant to one dollar a day to all approved hospitals, as an emergency relief for a period of one year. The present grant is fifty cents a day. Extreme want which exists in a considerable portion of the rural area has resulted in the temporary insolvency of many farmers, and this in turn has resulted in large decreases in the percentages of accounts collected by hospitals.

The following is a list of officers of the Alberta Hospital Association elected during the annual meeting held in Calgary in November, 1930: *Honorary President*, Hon. George Hoadley; *President*, A. T. Stephenson, Red Deer; *Vice-president*, Dr. A. T. Washburn, Edmonton; *Secretary-Treasurer*, T. Cox, Edmonton.

Dr. Harvey Agnew, in an address given in Calgary during the meeting of the Alberta Hospital Association, remarked "We never know exactly what to expect in the way of health measures from Alberta, but whatever they are we can always feel that anything coming out of this province will be something different and generally several years ahead of all the others."

Dr. E. A. Hunt, who has been in London, England, during the past year, engaged in post-graduate work, is now a junior surgeon in the Prince of Wales Hospital.

G. E. LEARMONTH

BRITISH COLUMBIA

The Fourth Annual Report of the Queen Alexandra Solarium for Crippled Children at Malahat Beach, B.C., has just been published. This small institution, which treats tuberculosis, other than the pulmonary form, in children, as well as deformities and paralysis, has had during the past year fifty-eight patients. Every advantage is taken of the favourable situation and mild climate in promoting recovery of the inmates. Adequate physiotherapy and a school-room are features of the institution. Funds are provided partly by provincial and municipal grants; partly by voluntary subscriptions and partly by fees from paying patients. The financial report shows a creditable balance.

During the week of November 10th to 15th the Greater Vancouver Health League held an exhibition in Vancouver; this being a part of the program of the Canadian Social Hygiene Council. Daily lectures were given by members of the medical profession and the motion picture ("The Gift of Life") was shown. Numerous exhibits, the property of the Canadian Social Hygiene Council, and booths by allied interested bodies, made an exceedingly interesting and instructive display. The attendance was gratifying.

Two meetings of the Fraser Valley Medical Society were held in November. At the first Mr. C. J. Fletcher, Executive Secretary of the British Columbia Medical Association, gave an interesting address on "Activities of the British Columbia Medical Association". The other meeting was addressed by Dr. J. H. MacDermot of Vancouver, who spoke at some length on "Health insurance."

The Provincial Police Department of British Columbia has agreed to continue the arrangement of issuing a block of motor licence plates for medical men only. This concession is greatly appreciated by the profession.

The question of illegal cults is, unfortunately, again to the fore in British Columbia. The College of Physicians and Surgeons is making every effort to induce the Provincial Government to appoint a Royal Commission with a view of finding a solution of the problem, and thus avoiding the expense and trouble of fighting this matter in the House year after year.

Several meetings of joint committees of the British Columbia Medical Association and Vancouver Medical Associations have recently been held with a view to bringing about closer cooperation or amalgamation of the two Associations.

The Cancer Committee of the British Columbia Medical Association, under the chairmanship of Dr. C. W. Prowd, continues to be very active. A letter has been written to Dr. H. E. Young, Provincial Health Officer, urging the necessity of making cancer a reportable disease, and pointing out that further information as to the number of cases, their classification, types of treatment and results, with an adequate follow-up system, will be materially aided by systematic reporting of all cases. Such action by our Health Department would place us on a par with the other western provinces which already have made cancer reportable. It would also make common control and Dominion-wide statistics possible.

The Vancouver Medical Association was fortunate in hearing addresses on December 3rd, by Prof. Wm. Boyd, of Winnipeg, and Dr. Emil Riess, of Chicago. Professor Boyd emphasized the importance to the practical man of adequate theoretical training, illustrating this by the history of the conquest of yellow fever. Dr. Riess gave an exceedingly interesting lecture on "Pseudomyxomatous disease of the peritoneum."

Dr. H. E. Young, Health Officer for British Columbia, attended the meeting of the Federal Council of Health in Ottawa from December 8 to 12, 1930.

C. H. BASTIN

MANITOBA

Professor William Boyd, exchange professor from the University of Manitoba to the three western universities, returned to Winnipeg on December 8th, after visiting Saskatoon, Edmonton and Vancouver, where he gave addresses on pathology. His new work, "The Pathology of Internal Diseases" published by Messrs. Lea and Febiger, will appear in January.

A Committee on Medical Services in Manitoba, composed of five members from the College of Physicians and Surgeons of Manitoba and four members from the Manitoba Medical Association, is now functioning. Investigations are being conducted along several lines, and information is being secured on such topics as the cost of medical care; the distribution of medical men in the province; the cost of medical education; state health insurance; voluntary health insurance schemes; and the provision of nursing services.

F. W. Jackson, M.D., D.P.H., has taken over the duties of Deputy Minister of Health and Public Welfare, in succession to Dr. T. A. Pincock, who has accepted the position of Superintendent of the Hospital for Mental Diseases at Brandon. Dr. C. A. Baragar, who formerly held that position, has been appointed Provincial Psychiatrist for Alberta, with headquarters at Edmonton.

ROSS MITCHELL

NEW BRUNSWICK

The new wing of the Moncton City Hospital was officially opened on October 28th. Special addresses were delivered by the following: Premier J. B. M. Baxter, Lieutenant-Governor Hugh H. MacLean, Dr. H. I. Taylor, Minister of Health, Dr. O. B. Price, Senator C. W. Robinson, Mayor C. W. Redmond, Rev. Canon B. Sisam, and W. W. Kenney, Superintendent of the Victoria General Hospital, Halifax.

The new wing, modern in every respect as to construction and equipment, will house 74 additional patients on its three floors. The building is entirely fire-proof. A new x-ray department has been installed and larger quarters for the pathological laboratory have been provided.

Dr. W. F. Roberts, of Saint John, has received the unusual honour of being elected to the Presidency of the American Academy of Physical Therapy. This honour was conferred on Dr. Roberts at the meeting of the Academy recently held in Boston.

On November 20th, five nurses graduated from the Evangeline Maternity Hospital in Saint John. Dr. W. W. White, Mayor of the City, presided. Dr. A. E. Logie read the report of the Medical Superintendent. Dr. F. W. Stevenson administered the Florence Nightingale pledge.

At a recent meeting of the Medical Board of the Fisher Memorial Hospital of Woodstock, a recommendation of the Board was forwarded to the governing body calling attention to the necessity of an immediate increase in accommodation for obstetrical and infectious cases.

Dr. John Beatty and Dr. H. Segall were the speakers at extra-mural meetings in Newcastle and Sackville during the month.

Dr. E. T. Kennedy, of Sussex, was elected Mayor of the Municipality on December 1st, following a keenly contested campaign.

Dr. Lachlan McPherson has been confined to hospital, in Saint John, by an attack of typhoid. Dr. McPherson's convalescence is reported to be satisfactory.

Dr. R. A. Hughes, of Saint John, has returned to the practice of his specialty in eye, ear, nose and throat work, following a three months' post-graduate visit to London, England. Dr. Hughes spent most of his time doing special eye work and facial plastic surgery. He reports that the post-graduate facilities in these special lines provided by the London hospitals are of a very high order.

Dr. D. R. McDonald, until recently practising at Petitcodiac, has removed to Shediac where he succeeds Dr. M. A. Oulton, who has removed to Saint John.

Dr. G. Clowes VanWart, Chairman of the Fredericton School Board, was the recipient of a complimentary presentation by the members of the Board on November 27th. Dr. VanWart is leaving shortly on a trip around the world.

Dr. G. G. Corbet, of Saint John, was re-elected president of the New Brunswick Division of the Saint John Ambulance Association at their annual meeting this month.

Dr. G. N. Belyea, of Woodstock, delivered the address to the graduating class of the Fisher Memorial Hospital on the evening of November 29th. This graduating class consisted of five nurses.

A. STANLEY KIRKLAND

NOVA SCOTIA

The annual meeting of the Halifax Children's Hospital was held on November 11th. Much to the regret of everyone, Mr. O. E. Smith, President of the hospital, was unable to be present on account of illness. Mr. J. L. Hetherington, Vice-president, presided very acceptably in Mr. Smith's absence, and paid a tribute to Mr. Smith's splendid work on behalf of the hospital. The building for the nurses' residence is now approaching completion, and very soon more room will be available in the hospital building for the reception of patients. Reporting for the Medical Board, Dr. W. Alan Curry stated that the admissions to the hospital had numbered twice as many as in the preceding year; 554 operations had been performed, and the medical staff had been busily engaged throughout the year.

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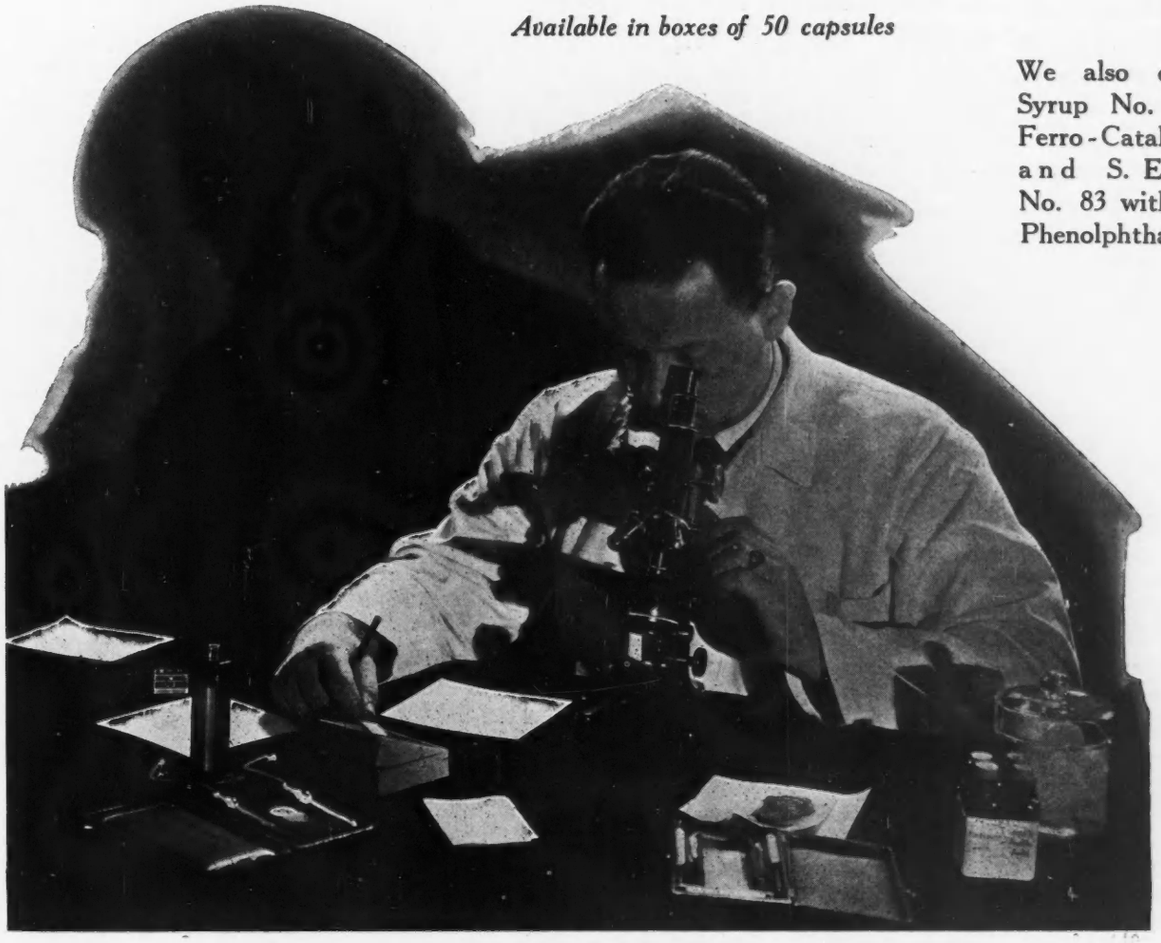

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MONTREAL

A class of 26 nurses graduated from the training school of the Victoria General Hospital on November 27th. The Hon. George E. Faulkner presided at the ceremony, and the Hon. John Doull, Provincial Secretary, presented the diplomas and prizes. Dr. W. L. Muir delivered the address to the graduates. At the conclusion of the exercises, the graduates and their friends repaired to the Lord Nelson Hotel, where a very enjoyable evening was spent at cards and dancing.

Representatives of the Medical Society of Nova Scotia and of the Association of Medical Health Officers recently met the provincial government, by invitation of the government, to discuss means of improving methods of dealing with tuberculosis in Nova Scotia. It is announced that agreement was reached that a substantial sum should be appropriated for additional accommodation for infirmary cases at the Nova Scotia Sanatorium, Kentville, and that a further amount should be appropriated for the erection of a hospital for advanced cases at a suitable place in the island of Cape Breton. In addition the sum of $80,000.00 is to be used for other anti-tuberculosis activities. The Prime Minister gave assurance that the government would give effect to the recommendations agreed upon.

The new building of the Soldiers' Memorial Hospital, Inverness, was opened with appropriate ceremonies on November 25th. This institution was established several years ago in an adapted building which soon proved inadequate. In its new quarters the hospital may be expected to render an even finer service to the community than it has rendered in the past. The old building will be used hereafter as a residence for nurses.

W. H. HATTIE

ONTARIO

The Annual Meeting of the Banting Research Foundation, November, 1930

The Trustees of the Banting Research Foundation are now in receipt of an income of some thirty thousand dollars. Under the terms of its charter, this income is partly disbursed for the maintenance of researches carried on under Prof. F. G. Banting and the greater part in the form of grants for living expenses, supplies, and apparatus to such persons who propose to undertake the investigation of medical problems. Such applications are considered by the Board of Trustees, assisted by an Advisory Committee, on which are found representatives of most of the medical schools in Canada. All grantees are required to present a report to the Trustees at the end of the period of their grant, or as soon thereafter as the data can be studied and compiled. The Honorary Secretary, in consequence, presented final reports from the following grantees at the annual meeting held on November 20, 1930:—

Dr. A. E. Macdonald, University of Toronto, on "Absolute Stereoscopy, Stereoscopic Inversion, and Micro-macropsia Phenomena"; Miss Elizabeth G. Frame, Dalhousie University, "A Comparative Histological Study of the Spleen of various Vertebrates with reference to the Cellular Constituents of the Spleen, the Bone Marrow and the Blood"; Dr. T. A. Sweet, Toronto, "On the Respiratory Centre"; Dr. H. E. Rawlinson, University of Alberta, "The Absorption of the Sinus Venosus in the Development of the Beef Heart, and its Relation to the specific Sino-Atrial Tissue"; Dr. W. M. Lloyd, Toronto, "On the pathological Findings in the Myocardium in Yellow Fever and the functional Changes accompanying them"; Dr. J. L. Jackson, University of Manitoba, "The Size and Shape of the Human Thyroid Follicle in Health and Disease"; Dr. W. E. Brown and Dr. A. S. Kennedy, Toronto, "On the Co-administration of Carbon Dioxide with Nitrous Oxide in Anæsthesia"; Dr. Digby Wheeler, Winnipeg, "A Histological and Biochemical Study of pathological Thyroid Material, with special Reference to the effect of Lugol's Solution"; P. G. Egnatoff, University of Saskatchewan, "On the Vaso-motor Centre".

Interim reports were presented from the following grantees; Prof. H. D. Kay, Toronto, on "Irradiated Ergosterol and its effects on Calcification"; W. T. Grant, Toronto, "On the Identification of certain Cranial and Cerebral Features by X-rays"; J. M. Hershey, Toronto, "Substitution of Lecithin for raw Pancreas in the diet of the depancreatized Dog"; Dr. C. M. Jephcott, Toronto, "On the Distribution of Insulin in the Body"; H. C. Graham and F. F. Musgrave, Dalhousie University, "Studies of Uric Acid".

Grantees who are at present in receipt of grants, or whose work is so recent that reports have not as yet been received, are as follows: Dr. Bruce Chown, University of Manitoba, "On Pyelitis in Children"; Prof. D. Mainland, Universities of Manitoba and Dalhousie, "On the Effect of the Thyroid on the Ovaries"; Dr. A. M. Davidson, Manitoba, "On the Characteristics of certain dermal parasitic Fungi"; Dr. R. Gottlieb, McGill University, "The Rôle of the Liver in Bile Formation in Man and higher Animals, and Anhepatogenous Bile Formation"; Prof. H. A. Cates and Dr. D. Irwin, Toronto, on "The Plane of the Pelvic Inlet and its Relation to Pregnancy and Parturition"; Dr. F. H. Smith, St. Boniface, "Anæmia of Pregnancy"; Dr. John McEachern, Winnipeg, "Changes in Blood Cholesterol".

V. E. HENDERSON

QUEBEC

Dr. G. Elliot Smith, Professor of Anatomy in University College, London, addressed a large audience, before the Sigma Chi Society, on December 1st, in the Biological Building of McGill University. His subject was the recent discovery of remains of prehistoric man near Pekin which has stirred anthropological circles so profoundly.

Dr. Smith traced the history of this particular work from its inception to the present. Had not Dr. Sun Yat Sen, chief actor in China's Revolution in 1911, deploring China's lack of scientific knowledge, instituted a geological survey of China, another link of human evolution might yet be missing. In 1919 a geological survey of eastern China was completed. Dr. Andersen, a Swedish professor, discovered important fossil remains in the limestone hills back of Pekin.

Some time later the imagination of Dr. Davidson Black, a Canadian graduate, Professor of Anatomy in the Pekin Medical College, was stirred by the discovery of several fossilized teeth. Although the Rockefeller Institute had little faith in Dr. Black's new project a two years' appropriation fund was granted him. From a careful comparison and accurate measurements of the fossilized teeth with those of apes and modern men, Dr. Black decided that the teeth belonged to a creature closer in structure to man that to ape. On the basis

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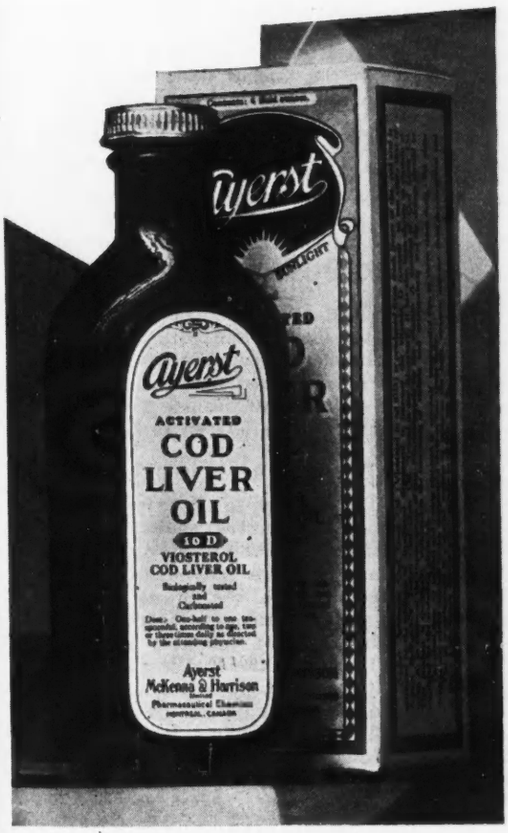

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of the morphological characteristics Dr. Black founded a new species, *Homo sinensis*. For this audacious act Dr. Davidson Black was severely criticized by the most prominent anthropologists. However, the discovery, soon after, of fossilized jaw fragments supported his conclusion.

Another appropriation for three years was granted Dr. Black by the Rockefeller Institute. Within this period were made the two most important finds. The upper halves of two almost perfect skulls were discovered imbedded in travertine. Using a dental drill, Dr. Black painstakingly cleaned the matrix from the fossil.

Perhaps the most interesting find was the discovery of definite localized expansions of the cranium in the temporal and occipital regions, indicating a much higher stage of evolution than in the case of the apes, corresponding to brain developments in language formation and the sense of touch.

Incidentally, the remains found in the caves near Pekin afforded strong evidence in favour of the view that the lower jaw and skull-cap found at Piltdown in Sussex belonged to the same individual, a view that some anthropologists have disputed. The Pekin man is probably of earlier date than *Pithecanthropus erectus* (the Java man) or than the Piltdown man. Furthermore, *Homo sinensis* (the Pekin man) most likely represents the main trunk from which modern man is descended, while the other two represent collateral branches.

The lecture was illustrated by many lantern slides which helped greatly to elucidate a difficult subject.

The present work of the Mental Hygiene Institute of Montreal is a direct outgrowth of one of the first general Mental Hygiene clinical services in America. Shortly after the organization of the Canadian National Committee for Mental Hygiene, and through the agency of this national body, a Mental Hygiene clinic was organized in Montreal. In 1923 this organization was taken over by the Montreal Council of Social Agencies and carried on under the name of the Mental Hygiene Committee of Montreal. The clinic operated by the Montreal Committee served largely as a consultation treatment centre for behaviour problems, in the beginning referred principally by the Social Agency groups and gradually extending its clinical and educational services to other groups in the community. One of the factors which made possible the extension of the community work was the introduction of additional personnel, with the inception of the Canadian National Committee Mental Hygiene research program in Montreal in 1924. The group introduced at that time and increased since, together with personnel already in the field, has carried the teaching programs in Psychiatry, Abnormal Psychology and Mental Hygiene in the University and has directed the community programs of Mental Hygiene and Parent Education.

In October, 1929, through the cooperative efforts of the Montreal Council of Social Agencies, the Canadian National Committee for Mental Hygiene and McGill University, the Mental Hygiene Institute of Montreal was incorporated and established in a setting in close physical relationship to McGill University and in a very intimate way related to the Department of Public Health and Preventive Medicine, at the same time retaining and increasing the points of community contact.

The objectives of the organization may be stated as follows:

(1) To provide a Mental Hygiene service, clinical and educational, to the community, in an attempt to meet immediate problems of mental health and to gradually increase the capacity of the community to appreciate and to deal, in a broad and constructive way, with this phase of the general health of the community.

(2) To provide facilities for research in the field of Mental Hygiene.

(3) To give to undergraduate college groups a dynamic concept of mental health and mental disorder and at the same time an understanding of the mental health needs of the individual during the developmental period and some appreciation of how these needs may be met.

(4) To meet in a practical way some of the mental health needs of the individual college student.

(5) To provide facilities for post-graduate mental hygiene training in an attempt to meet the very real country-wide need for trained personnel.

(6) To give assistance and direction in the establishing of community mental hygiene clinics and the organization of community mental hygiene programs.

The St. Michael the Archangel Asylum for the Insane at Beauport was partially destroyed by fire on December 15th. This institution houses some 2,000 patients. It was necessary to remove one-half of these, and this extraordinarily difficult task was done quickly and without fatality. The only thing that made such a performance possible was perfect organization and calm courage in the face of terrible danger. The sisters in charge of the asylum deserve great credit for their achievement, which should be made known throughout Canada as worthy of the fine tradition that they serve.

The Grace Dart Home Hospital, founded in 1898, is maintained primarily for the care of destitute people suffering from pulmonary tuberculosis in its advanced stages. No distinction is made in regard to race, creed or nationality.

The hospital is at present located at 2334 St. Antoine Street, Montreal, where there is accommodation for some 30 patients. Owing to increasing public demands present facilities have been found quite inadequate, and a site has been obtained on Sherbrooke Street near Cadillac Street. Here a new building will be erected with immediate accommodation for 100 patients in all stages of the disease and with provision for doubling that number when circumstances make it necessary. The new site is considered particularly well suited for the requirements of the institution. The plans call for a present expenditure of $450,000 on building and equipment.

Public offering of an issue of 5 per cent serial bonds of the Grace Dart Home Hospital, Montreal, by a Montreal investment house, is expected shortly. The bonds will be wholly subsidized by the Quebec Government as to principal and interest payments. The security behind the proposed issue lies in an Order-in-Council, approved by the Lieutenant-Governor, by which a grant has been made of amounts payable annually and semi-annually out of the Public Charities Fund sufficient to meet the interest upon and amortize the bonds at their respective maturity dates. In addition the bonds will be secured by a first and specific mortgage on the new hospital building and fixtures, the value of which when completed, including the land, is estimated at $425,615.

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Dr. Harvey Agnew addressed the staff of the Regina General Hospital at the lunch hour on results of the survey of medical practice. He presented striking facts about the cost of medical services, which showed that compared to expenditures for luxury in Canada the price of medical care was low, for example, three times as much is spent on liquor in Canada as is spent in paying doctors. He stated that the average Canadian has the next two years' salary spent on instalment payments before he gets the money, hence the payment of an emergency fee to a doctor has no place in his budget. The result is that the magazines are filled with articles deploring the high cost of medical services.

Dr. S. R. D. Hewitt presented a paper on "Dilatation of the aorta" at a recent meeting of the staff of the Regina General Hospital. It was followed by a paper on "Aneurysms" by Dr. R. Riley.

The Regina General Hospital staff elected the following officers for the coming year: *President,* Dr. D. C. Hart; *Vice-president,* Dr. Lillian A. Chase; *Secretary,* Dr. C. Hookings; *Executive Committee,* Dr. S. S. E. Moore and O. E. Rothwell.

Dr. Anna Nicholson who graduated from University of Toronto in 1925 and has since been doing post-graduate work in Philadelphia, New York and the Rotunda, Dublin, has opened an office in Saskatoon.

LILLIAN A. CHASE

UNITED STATES

The Nobel Prizeman in Medicine

The Nobel Prize for Medicine for 1930 has been awarded to Dr. Karl Landsteiner, formerly of Vienna, and now of the Rockefeller Institute for Medical Research in New York. His name is best known in connection with his work upon the blood groups, and it may be truly said that he laid the foundations of all present knowledge of this subject. Since the work of Shattock in 1899 it had been recognized that some human sera had the power of agglutinating other human red cells, but this was regarded as a pathological phenomenon. Working in 1900 and 1901 Landsteiner not only showed that agglutination of human red cells could be brought about by other human sera in the absence of any pathological conditions, but was able to demonstrate that human beings could be ranged in certain groups on the basis of this reaction. Actually Landsteiner recognized what are now known as groups A (II.), B (III.), and O(IV.). In 1902 Decastello and Sturli, following up his work with his approval, demonstrated the existence of Group A B (I.). Landsteiner showed that the constitution of the groups could be accounted for by the postulation of two agglutinable substances, or (as they are now called) agglutinogens, resident in the red cells and two homologous agglutinins resident in the sera. He believed that the agglutinins were reciprocal to the agglutinogens, but this has since been proved not to be so. His discovery was allowed to remain almost unnoticed for years, although he specifically pointed out its possible applications both in the practice of blood transfusion and in the determination of paternity. The late war, with its great increase in the practice of blood transfusion, brought his work into notice and proved the correctness of his opinions on this subject; but only within the last few years has the truth and importance of his views on hereditary transmission of the agglutinogens become generally recognized.

Noise Abatement Commission

After twelve months of research and investigation by otologists, neurologists, engineers, acoustic specialists, lawyers, and others, the report of the New York Noise Abatement Commission has been published. The following observations are selected by *Health News* as the most significant resulting from the Commission's work:—

Hearing is apt to be impaired in those exposed to constant loud noises.

Noise interferes seriously with the efficiency of the worker. It lessens attention and makes concentration upon any task difficult.

In the attempt to overcome the effect of noise, great strain is put on the nervous system, leading to neurasthenic and psychasthenic states, and necessitating frequent recuperation in the country to maintain mental efficiency and alertness.

Noise interferes seriously with sleep, even though in some cases it appears that the system is able to adjust itself so that wakefulness does not result.

It is well established that, in addition to other evil effects, the normal development of infants and young children is seriously interfered with by loud noises.

The newspapers cooperated with the Commission by inviting complaints from the public regarding specific noises. The noises most frequently complained of included outdoor loud speakers, steamship whistles, pile-drivers, subway and elevated trains, riveting machines, and automobile horns. The Commission is able to suggest methods by which many of the objectionable noises can be diminished or eliminated, but the extent to which these methods can be applied will depend largely on public interest in the question.—*The Lancet,* 1930, **2:** 1145.

Pollution of the atmosphere of Manhattan

An investigation by Professor H. H. Sheldon indicates that approximately 2,300 tons of foreign matter float in the Manhattan atmosphere. Professor Sheldon used a rather unique method in making the tests by measuring the amount of dust and dirt caught by the air-conditioning systems in Broadway motion picture theatres. These systems, in addition to circulating the air, wash and humidify—or dehumidify—it. In this process, which is accomplished by water sprays, 96 per cent of the foreign particles in the atmosphere is removed. The test revealed that the 341,000,000 cubic feet of air passing through the tanks contained 11 1-4 cubic feet of dust and dirt. This ratio applied to the city's atmosphere gives 25,160 cubic feet, or 2,300 tons as the amount of foreign particles in the air. Samples analyzed indicate that 65 per cent of these particles were unconsumed carbon, 15 per cent stone dust and mineral matter, and 20 per cent germs.—*Pub. Health Engin., Abs.,* Feb. 23, 1930.

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Typhoid Carriers

New Jersey now has thirty-six known typhoid carriers on its list, which includes seven added during the last year. The occupation and residence of each typhoid carrier resident in the state is checked at least once a year by local authorities. A regulation requiring a report of all typhoid carriers has been adopted by Ohio, Michigan and Indiana.

Dr. Cushing Honoured

Dr. Harvey Cushing, Boston, received, December 6th, the award of the Montclair Yale Bowl for 1930 by the Yale Club of Montclair, New Jersey. The presentation follows the custom of the past decade, which recognizes eminent graduates of Yale. The award has not heretofore gone to any professional man or scientist. Dr. Cushing graduated from Yale in 1891.

Gift to Johns Hopkins Medical School

Johns Hopkins Medical School receives two important gifts from recent appropriations of the General Education Board. A half-million dollars goes to the completion of the William Osler medical clinic and of the William Stewart Halstead surgical clinic. The department of medical history, which has already received a million dollar endowment from the Board, is now given in addition $12,500 for each of five years and a capital sum of $250,000, making possible the provision of a larger faculty for the department, which, it will be remembered, is under the direction of Dr. William H. Welch.

Gift to Chicago University Medical School

The University of Chicago also receives from the General Education Board a million dollars towards the fund needed for the construction, equipment, endowment, and maintenance of two buildings to house respectively the department of hygiene and bacteriology and the department of anatomy.

The New York Polyclinic

The New York Polyclinic Medical School and Hospital opened for inspection its new private pavilion and operating rooms, December 29 and 30, 1930.

The appointments are announced of Dr. George D. Stewart, as Consulting Surgeon, and Drs. Evan Evans, Orrin S. Wightman and C. N. B. Camac, as Consulting Physicians to the Hospital.

The Beaumont Lectures

The annual Beaumont Lectures of the Wayne County Medical Society of Detroit, Michigan, will be delivered this year by Dr. James Ewing, Professor of Pathology, Cornell University Medical School, in the auditorium of the Society in the Maccabees Building, Detroit, Michigan, on the evening of January 26th and the morning of January 27th. These dates are as yet tentative, subject to possible postponement.

Members of the Canadian Medical Association are cordially invited by the Wayne County Medical Society to be present.

GENERAL

The International Medical Post-graduate Courses in Berlin

These are arranged with the help of the medical faculty of the University by the Lecturers' Association for Medical Continuation Courses and the Kaiserin Friedrich-Haus.

COURSES IN MARCH/APRIL, 1931

1. Continuation course on pathology (from 2-7, III) fee RM 50.

2. Summary course for practitioners—one week, the doctor in practical therapeutics; one week, the doctor in practical diagnostics—(from 9-21, III); fee RM 75.

3. Continuation course on practical improvements in ray-therapeutics, from 22-29, III); fee RM 80.

4. Special course on surgery (from 13-18, IV); fee RM 75.

5. Single courses on all special fields of medical science, including practical work are monthly.

The information bureau of the Kaiserin Friedrich-Haus für das ärztliche Fortbildungswesen, Berlin NW 6, Luisenplatz 2-4, is instrumental in procuring suitable lodgings, gives information as to cost of stay, arranges the attendance in clinics at operations, etc., and, upon request sends detailed syllabuses.

Book Reviews

A Synopsis of Medicine. Henry Letheby Tidy, M.A., M.D., B.Ch. (Oxon.), F.R.C.P. (Lond.), Physician to St. Thomas's Hospital, &c. Fifth edition revised and enlarged; 1032 pp. $6.25. John Wright and Sons, Ltd., Bristol; The Macmillan Co., of Canada, Toronto, 1930.

This excellent work is far from being an ordinary "quiz compend" and cannot be read through in a night. Following in general the arrangement of Osler's *Principles and Practice of Medicine*, it yet preserves a certain individuality and is much more than a skeleton of the usual text-book descriptions of disease. Etiology is usually well considered, and the points relating to differential diagnosis are fully and clearly stated. Helpful little notes as to what is of value and of no value in treatment are interspersed. It is the author's hope, as expressed in the preface to the first edition, "that the book may be of assistance to those who have to revise rapidly their knowledge of medicine in general or of some disease in particular: to the worried student whose final examinations are within sight and to the hurried practitioner from whose ken they have long passed, possibly even to the teacher with a lecture to prepare and to the examiner who, for the purpose of a *viva voce*, desires to renew for a brief period his knowledge of any of the essential details of medicine." That this hope was well founded is evident from the success of the book which has gone through five editions and several revisions in little more than ten years. For the purposes stated the book is admirably adapted. There has been some pruning, but new material has been added and new articles provided which are necessitated by recent advances in knowledge. Notable among these are the dissertations on Infection with *B. abortus*. Tularæmia, Post-vaccinal Encephalitis, Erythema Nodosum, Rocky Mountain Fever, Psittacosis, Epidemic Pleurisy, Sickle-cell Anæmia, Agranulocytosis, and Coronary Thrombosis. The book is the best of its kind that we have seen.

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The Treatment of Asthma. A. H. Douthwaite, M.D., F.R.C.P., Assistant Physician, Guy's Hospital, etc. 164 pages. Price 7/6 net. H. K. Lewis, Co. Ltd., London, 1930.

One almost feels that no new books on asthma should be written unless they can add something new to our knowledge of it. Perhaps a compromise might be reached on the understanding that whatever is so written should be short. After reading through the present volume one is inclined to feel that nothing new has been produced, but that, on the other hand, a great deal of useful material has been compressed into a small space. It might have been well if a little more attention had been given to the really severe cases of asthma, those which go steadily downwards in spite of unremitting care along the most approved modern lines. These are the patients who remind us most forcibly of the general implications of asthma, a point of view which happily is being insisted on more and more, and, it may be said, is well supported in this book.

"In no other disease", the author concludes, "is greater concentration on detail demanded of the physician." His book will be a useful guide in recalling the many details to be dealt with.

Rose and Carless' Manual of Surgery. Cecil P. G. Wakeley, F.R.C.S., F.R.S., Erasmus Wilson Lecturer, Royal College of Surgeons, of England, etc., and John B. Hunter, M.C., M.Chir., F.R.C.S., Assistant Surgeon, King's College Hospital, etc. 13th edition. 1592 pages, illustrated. Toronto, J. F. Hartz Co., Ltd., 1930.

In this edition a foreword by Albert Carless and a preface by Cecil P. G. Wakeley both note that this well-known surgery has been printed and re-printed during the past thirty-two years. Such continuous success is explained by the increasing size of the volume which is now sixteen hundred pages, not including th entirely new and excellent "radiographic supplement" of over forty clear-cut and important x-ray pictures of bone, intestinal, genito-urinary and other pathologic conditions. The volume contains bacteriology, pathology, and enough anatomy to make the clinical and the technical aspects of surgery clear to the student, while the general practitioner and the surgical expert will find readily accessible a vast amount of reference information. One misses the coloured illustrations which are fortunately so common now in the newer text-books and monographs, but the few full page coloured illustrations which the book does contain are excellent.

For any author to combine in one volume the whole field of general surgery and the surgical specialties is a big effort. To do it so thoroughly, so satisfactorily, and so concisely is proof conclusive of a master author. For medical school libraries, for the medical undergraduate, and for the practitioner anywhere the reviewer knows of no work that will so well meet the demand in surgery. As John of Mirfield, an early writer on surgery in England, said many years ago, "a surgeon is good for nothing who is without knowledge of medicine". In Rose and Carless' Surgery medical diseases are treated in so far as their treatment calls for surgical measures to prevent complications, correct deformities, or relieve pain, even if the disease may not be considered surgical. In the orthopædic section special attention is so given to many of the diseases of the central nervous system.

Primer on Fractures. Prepared by the Coöperative Committee on Fractures, American Medical Assocaition. 55 pages, illustrated. Price $1.00. Published by the American Medical Association, 535 North Dearborn St., Chicago, Ill., 1930.

"The Fracture Primer" is exactly what the name implies. It is not for the purposes of standardizing treatment but merely to suggest methods that are acceptable. The illustrations are intended to show only the principles of treatment and of the application of splints and plasters, not the details of the technique. The legends accompanying the illustrations are of the greatest value. The blank spaces for notes, accompanying the illustrations, will be valuable for the student.

On the whole this primer fills a definite place and, when used for its intended purpose will be of the greatest assistance in the teaching of the treatment of fractures. The great danger of giving the student so much material in concentrated form will be the tendency to substitute it for a text-book, which it is in no sense claimed to be. The same may be said of its use by the practitioner.

Diseases of the Skin. A text-book for practitioners and students by George Clinton Andrews, A.B., M.D., Associate Professor of Dermatology, College of Physicians and Surgeons, Columbia University. Large 8vo, pp. x+1091, 988 illustrations. Price $12.00. Philadelphia W. B. Saunders Company, 1930; Canadian Agents, McAinsh and Co. Ltd., Toronto.

This work forms a most useful addition to a medical library. The general practitioner, because of its many practical and useful hints, will be guided in both his diagnosis and general conduct of his cases. For the practising dermatologist the book is indispensable because it sums up in practical and easily readable way the known facts concerning diseases of the skin as to their diagnosis and treatment. Several chapters in this admirable work deserve special mention, such as that on General Pathology which is most instructive. The practical aspects of dermatology are not neglected, as the long and detailed chapters devoted to the practical application of x-ray, radium, ultraviolet light, surgical diathermy and their effects are of great interest not only to dermatologists but to any practitioner using these forms of therapy. The photographs and microphotographs are many and excellent, and the bibliography most extensive.

The undergraduate should certainly have this book on hand as it is very practical, instructive and easy to read, and would be an excellent text-book.

A Text-Book of Physiology. William H. Howell, Ph.D., M.D., Sc.D., LL.D., Professor of Physiology in the School of Hygiene and Public Health, the Johns Hopkins University, Baltimore. 11th edition, 1099 pages, 308 illustrations. Price, $6.50. London and Philadelphia, W. B. Saunders Company; Toronto, McAinsh & Company, 1930.

The general features of this established text-book are too well known to require discussion; it is complete, lucid, succinct. The author's position as one of the senior physiologists of the continent invests his words with an authoritative certainty very refreshing to the student, and permits him to see recent fashions and discoveries in a proper perspective. It is clear that he is none the less keenly interested in each new advance. The present edition of the text refers suitably to such modern topics as the synthesis of hæmin by Fischer, Waldschmidt-Leitz's elucidation of the relation of enterokinase to trypsin, the complexity of vitamin B, the importance of the carotid sinus in the regulation of the blood-pressure, the presence of pyrophosphate in muscle, the probable nature of Warburg's "respiratory ferment" and of glutathione, the theory of conditioned reflexes, and many more. There are several references to papers published in 1930. Only one serious sin of omission has been noted, where the author says (page 903) that "clinical cases of excessive activity of the parathyroids seem not to have been reported." On page 816, valine is wrongly described as "aminoisopropionic acid" and there are occasional minor misprints. The sections dealing with methæmoglobin, erepsin, and the

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absorption of carbohydrates might be improved in the light of the work of Conant, Waldschmidt-Leitz, and Cori respectively. The type used is unattractive, but the paper and binding are excellent, and the price, considering the size and scope of the book, extremely moderate.

Bacteriological Technique. J. W. H. Eyre, M.D., M.S., F.R.S. Edin., Professor of Bacteriology in the University of London, and Director of the Bacteriological Department of Guy's Hospital, London. Third Edition. 619 pages, with 238 text-figures. Price 21/-, Baillière, Tindall and Cox, London, 1930.

It is always a pleasure to welcome a new edition of Eyre's Bacteriological Technique, which has now been a standard work for twenty-eight years. The aim of this book (and this has been achieved) is to provide detailed information on the various methods at present in use for the study of bacteria and the elucidation of such points in their life histories as are debatable or still undetermined. In the present edition newer methods and newer media that appear likely to stand the tests of time and application have been incorporated. There has been also an expansion of the methods applicable to animal experimentation, while the section devoted to bacteriological analyses has also been extensively revised and somewhat enlarged, and, as the author hopes, should prove extensively serviceable to the medical officer of health and the commercial bacteriologist.

Practically all instruments and apparatus of value in a bacteriological laboratory are described briefly and concisely with instructions as to their use. The sections on the preparation of media, ordinary and stock, are invaluable and that on the adjustment of nutrient media to pH standards, with correlation of these methods with older titration procedures, is exceedingly clear.

It is regretted that the new terminology of organisms of the American Society of Bacteriologists is omitted for the benefit of the younger school of students, and that the classification of streptococci is not more in line with recent work. Again there is no mention of the preparation of anti-human precipitin serum, and an excellent cement for the sealing of museum jars, namely a mixture of Stockholm tar and red lead, is not given. However, beyond these relatively minor omissions, the book is an excellent one and can be cordially recommended to post-graduates working for a diploma in bacteriology or public health, and to commercial and other bacteriologists. As a work of reference, for supplementing the usually scanty details of technique in the average manual of bacteriology, which it does not claim to supplant, a copy should be at hand in every laboratory. The print is large and clear and the numerous figures in the text are admirable.

Emergency Surgery. Hamilton Bailey, F.R.C.S. (Eng.), late Surgeon Dudley Road Hospital, Birmingham, etc. Vol. 1. 380 pages with 324 illustrations. Price in Canada $7.50. Bristol, John Wright & Sons, Ltd.; Toronto, Macmillan Co. of Canada, 1930.

The author of this book has succeeded in producing a work which will appeal to the small town and country practitioner doing minor surgery, to the man who occasionally does major work, and to the experienced surgeon, as it shows all details of the usual procedures and also treats of the rarer complications. There is no ambiguity about the operative technique and nothing is taken for granted. Many surgical appliances which are so commonly used in Canada, such as the Gatsch bed-frame and the universally used suction apparatus in hospital operating rooms and wards, are not noted, but their substitutes are described and so illustrated that their benefits may be secured even in country places. The frequent brief case notes graphically annotate the text, and make very interesting reading, as none are too full, and all have the surgeon's name attached. There are many ingenious hints in technique, some of them original with the author, which bespeak the care and thought Dr. Bailey has given to every operative procedure described.

The book is an excellent one for the final year student, and will also be of great value to him when he commences to practise.

Rembrandt, as seen by a Doctor. J. G. De Lint, M.D. 113 pages, 64 illustrations. J. Philip Kruseman, The Hague, Holland.

There is no particular reason why a doctor should look at Rembrandt's paintings in a different way from other men: it would be well perhaps if more doctors took time to look at them from any point of view at all. But Dr. De Lint has managed to make an attractive study of medical subjects in Rembrandt's work. Beginning with pictures which deal with physicians and quacks, he passes on to portraits of physicians, and then takes up those dealing with anatomy. One cannot but be struck with the attention the old masters paid to dissection of the human body. Perhaps the modern artist learns his anatomy thoroughly, but one never finds him depicting dissecting room scenes. In the Middle Ages of course dissecting attracted the attention of the public more than now: it was a kind of show to which anyone might be admitted, as can be seen in so many pictures of the time; the woodcut frontispiece of the famous "De Fabrica" is an instance. Rembrandt painted one of his greatest pictures in his "Lesson in Anatomy", and Dr. De Lint's comments on it are amongst the best in his very interesting book.

One really does not think of medicine in looking through the gallery which has been brought together in this volume, but the medical point of view may well serve as a starting point for the study of Rembrandt. Dr. De Lint says that, speaking as a doctor, his harvest has been great, and should the reader (of his book) be affected in the same degree as himself, the study will increase, if that is possible, his admiration for that great genius Rembrandt.

BOOKS RECEIVED

The Medical Clinics of North America. Vol. 14, No. 2. 552 pages, illustrated. Price: Cloth $18.00 per year for 6 numbers—Paper $13.50. London and Philadelphia, W. B. Saunders Co.; Canadian Agents, McAinsh & Co., Toronto, 1930.

Medical and Surgical Reports of the Episcopal Hospital. Vol. 6. Commemorating the 75th year of the hospital. 460 pages, illustrated. Philadelphia, Press of Wm. J. Dornan, 1930.

NATIONAL POST GRADUATE SCHOOL OF RADIOTHERAPY,
THE MOUNT VERNON HOSPITAL & RADIUM INSTITUTE,
Riding House-street, London, W.1.
Dean—
SIR CUTHBERT WALLACE, K.C.M.G., C.B., F.R.C.S.

An intensive course in
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will be held at the above School, commencing
MONDAY, MARCH 2ND, 1931
The course will be repeated on subsequent dates.
Applications for copies of the syllabus, &c., may be made at once, and these will be forwarded as soon as available.
The Dean will be glad to see prospective entrants by appointment.
THOS. A. GARNER, Secretary.